The IRON AGE

April 23, 1959 A Chilton Publication The National Metalworking Weekly

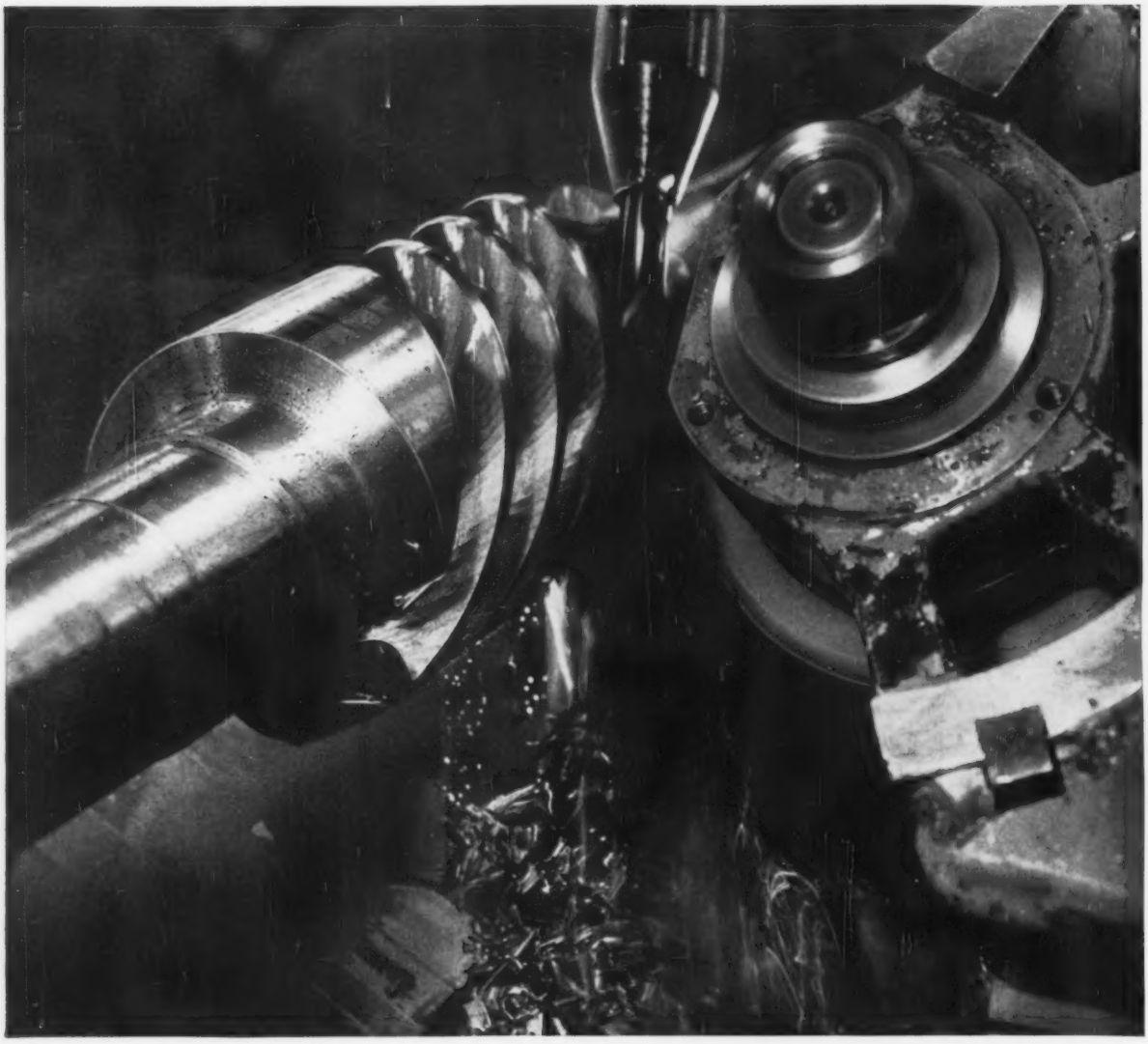
From "Storage Barns" to Service Centers—

Warehouses Take New Role in Steel Distribution P. 101

Can Warehouses Help Out in a Steel Strike? – P. 63

Why Most Engineers Won't Join Unions – P. 68

Digest of the Week – P. 2-3



Aristoloy leaded user reports 25% reduction in time required to cut worm gear threads

Cutting threads on worm gears is an expensive, time consuming operation. Geometry is critical and a considerable amount of metal must be removed. One of the large manufacturers of "worms," desiring to increase production, found that by switching to a *leaded* steel* he could increase both speeds and feeds. Equally important, expensive cutting tools lasted longer because of the freer machining characteristics of leaded steel—delivering more pieces between grinds, and drastically reducing down-time for tool changes.

Strength and hardness tests on the finished part, after heat treating, indicated no detectable difference in physical properties from unleaded grades previously used.

For complete information about Aristoloy leaded or standard analyses carbon, alloy, and stainless grades, write for booklet entitled, "A Complete Line of Leaded Steels," and new Products & Facilities Catalog. *Inland Ledloy License

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

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Tool Steel Topics

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BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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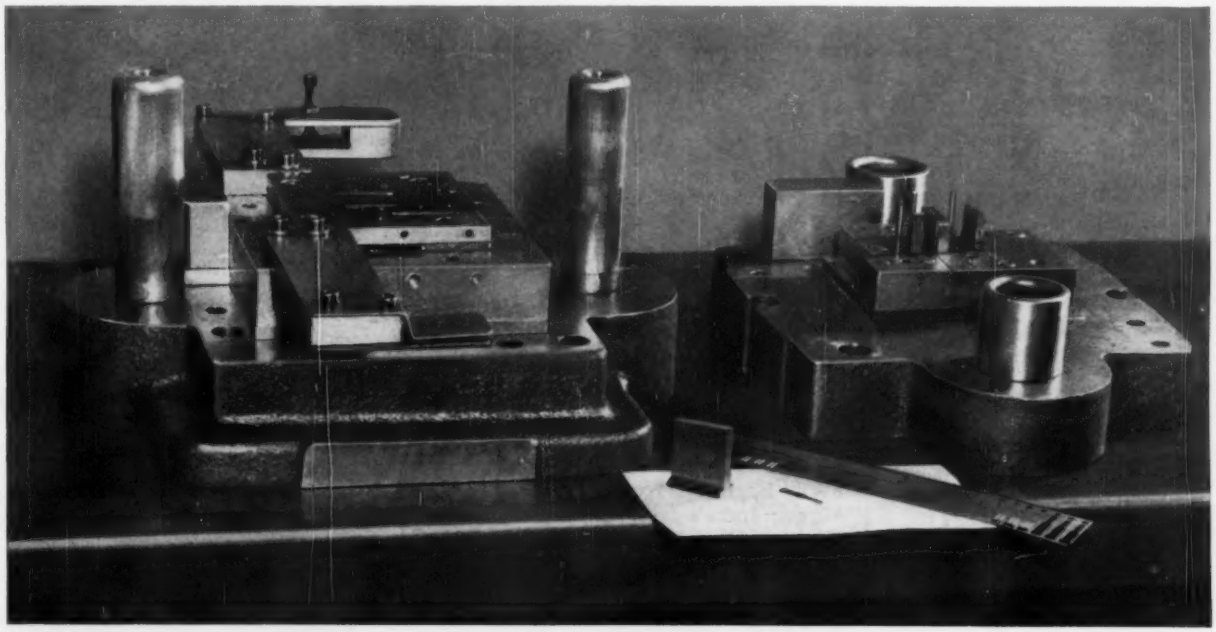
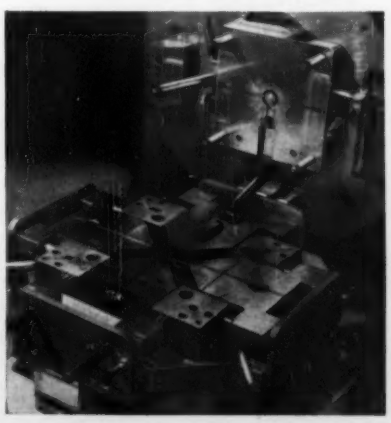


Blanking Die Output Doubles When Bearcat Takes Over

At the Remington Rand Division of Sperry Rand Corp. they were getting up to 50,000 pieces from a set of dies that blanks and forms grooved pins from .025-in. steel strip. Our local tool steel distributor, Leed Steel Co., suggested a change to our Bearcat tool steel. Result? The output increased to about 100,000 before the die needed reworking.

Bearcat has exceptional resistance to wear and shock. Because of its air-hardening characteristic, Bearcat minimizes quenching hazards and distortion in heat-treatment.



WIDE RANGE OF APPLICATIONS

In addition to blanking and forming jobs, Bearcat can be used economically in such varied applications as shear blades, punches, rivet sets, hot headers, die-casting die inserts, and master hobs. In fact, wherever the job calls for a grade having unusual toughness, Bearcat is the answer.

Your Bethlehem tool steel distributor carries Bearcat in stock in a wide size range. He's ready to serve you at a moment's notice. Give him a call today.

←Memo to Die-Casters:

USE CROMO-HIGH V (H-13)

You can't go wrong when you choose Bethlehem Cromo-High V (AISI-SAE H-13) for die-casting. This 5 pct chrome-moly grade, with 1 pct vanadium, has good resistance to wash and erosion, plus plenty of toughness. It's uniformly annealed, for easy machinability. It also has good center density and grain refinement, and is free from porosity.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Periodic Regrinding Improves Tool Life

The service life of many types of tools can be improved if the tools are periodically reground at intervals before they have deteriorated to a degree which impairs their function.

This practice is particularly useful when applied to tools which repeatedly fail in service by fatigue, chipping, spalling, or cracking through heat checks. The objective of preventative grinding is the removal of service-damaged metal before the damage progresses to a depth which would not be removed in normal redressing operations. It is an application of the old proverb, "A stitch in time saves nine," and is just as appropriate when applied to tools as to a small rip in a piece of wearing apparel.

The point at which regrinding should be done during the service of a given tool must be developed by experimental work. It is most practical if it can be made to coincide with a normal shutdown of an operation for other reasons.

THE IRON AGE
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April 23, 1959—Vol. 183, No. 17

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NEWS ARTICLES

WAREHOUSE INVENTORIES

Ready for a Strike—IRON AGE survey shows steel service centers believe they could support regular

customers through a 60-day steel strike. Total warehouse build-up by June 1 will be around 3.7 million tons. P. 63

BETTER PACKAGING

It Saves Money—Use of new materials, better design can save packaging costs. Westinghouse showed the way by saving $50,000 a year on motor cartons, slashed refrigerator packing by $250,000. P. 66

ENGINEERS' UNION?

Most Reject the Idea—A majority of engineers and scientists say unions aren't for them. University of Michigan group polled 270 professionals in 10 companies. P. 68

INDIAN STEEL EXPANSION

West vs. East—British, Germans, Russians, and Americans have been building steel mills in India. Kaiser Engineers finished up two months

Metalworking

◀ **MECHANIZE STEEL SERVICE:** To serve customers better, Precision Steel Warehouse, Inc. has gone to modern processing methods. J. B. Hobbs, Jr. (left), Works Manager, discusses production control system with George Tinsley, Sr., President, at Precision's new plant. P. 101

ago. The Russians still have months to go. P. 70

GAS MILEAGE

Better in '59 Cars—Most models showed improvement over last year in Mobilgas economy run. Rambler American made best overall showing. Other compact cars did well. P. 79

FEATURE ARTICLES

ROLLING MILL CONTROL

Remote Roll Changing — Electronics takes over roll changing for a rolling mill processing nuclear fuel elements. Four different roll assemblies take care of various rolling needs. The unit has a 600,000-lb maximum rolling load capacity at 100 fpm. P. 104

MAGNETIC STAINLESS

How Fabricating Affects — Almost any form of cold work is bound to affect the magnetic characteristics of stainless steels. It means that closely controlled procedures must be followed to meet magnetic requirements. Basic pointers are covered to help avoid common pitfalls. P. 106

STRETCH FORMER

Cuts Scrap Loss—Designed to cut high scrap losses in contour forming superalloys, a new stretch-forming machine first tests the yield strength of each work piece. The 92-ft long unit will contour form 10-ft diam nose cone rings to a full circle in a single radial draw. P. 110

METAL POWDER BARS

Continuous Processing — A simple compacting process transforms metal and ceramic powders into sheet, strip, or bar. The continuous method produces large cross section with excellent surfaces. P. 112

TRANSFER LINE

For Multiple Castings—The result of a new idea in transfer machines is the ability to process different size cylinder heads with fast changes in setup. The line can handle castings in both iron and aluminum. P. 114

MARKETS & PRICES

TOOL BUILDERS BATTLE

Low-Priced Imports — Some U. S. machine tool buyers are on strike against high cost of U. S. tools, says NMTBA head. He presents other reasons why U. S. tool builders are in for a fight. P. 87

FOUNDRY COMEBACK

Cost-Cutting Drives — Intensive cost-cutting campaigns put many foundries back in competition. They're regaining business and boosting profit. P. 67

PLANTS IN THE WEST

Additions and Expansions — Everywhere in the West from Arizona to Alaska new plants are coming in and existing ones expanding. Here's latest rundown on where they are and what they do. P. 85

WORRISOME DILEMMA

Steel Users Fret—Steel mills are falling behind on their delivery problems. This means that some steel users won't get at least part of the steel they expected by steel labor deadline. P. 141

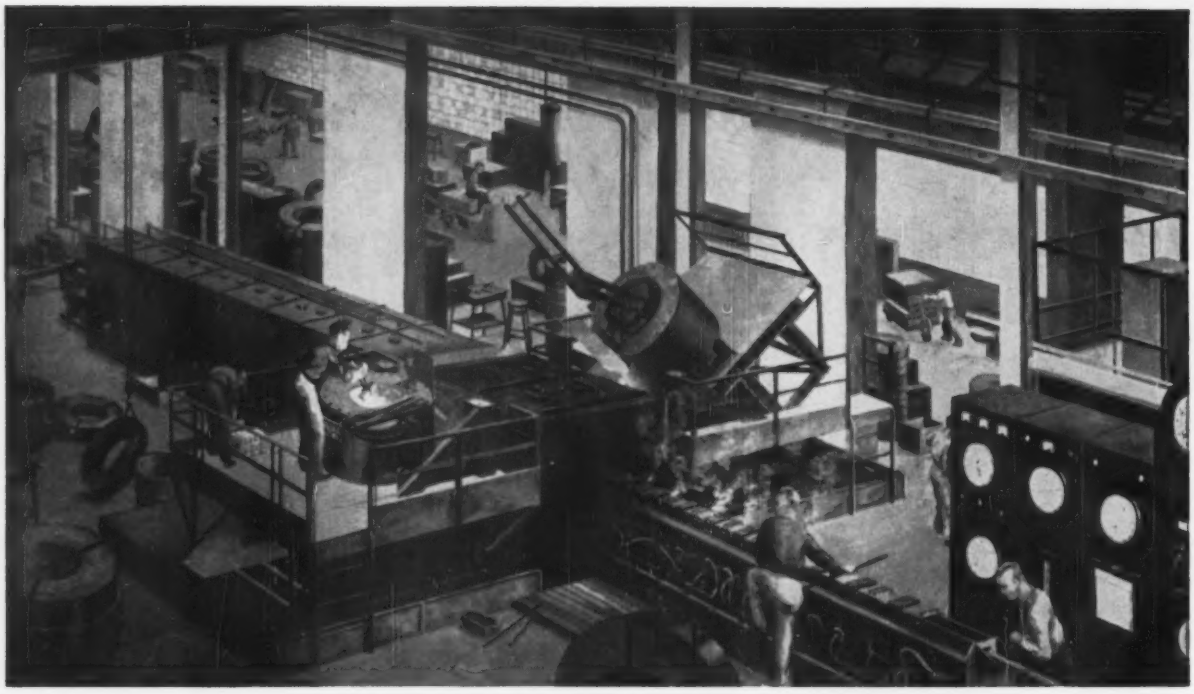
PORTABLE TOOL COSTS

Watch Them—Probability of increased raw materials costs next summer may mean higher portable tool prices. Delivery is still off the shelf for standard tools. Many new products are coming. P. 142

NEXT WEEK

TOOL STEEL

More for Your Dollar—Selection of the most appropriate tool steel for a given job can mean success or failure in almost every fabricating technique. Next week's "metalworking dollar" feature will review each major type.



60 CYCLE INDUCTION MELTING OF HIGH LEADED BRONZES

15 years ago, THE CLEVELAND GRAPHITE BRONZE COMPANY, division of CLEVITE CORPORATION, pioneered 60 CYCLE INDUCTION MELTING of bronzes with up to 35% lead. Special furnaces developed by AJAX for this difficult job are an important element in their unique continuous production line for steel-backed bronze bearing strip. 60 CYCLE INDUCTION MELTING furnaces resulted in substantial improvements and cost savings over gas-fired units used earlier for that purpose. Today, CLEVITE operates six continuous lines in this country and abroad with AJAX 60 CYCLE INDUCTION MELTING furnaces, producing enough strip to make 130 million bearings and bushings per year.

The heavy duty 60 cycle inductor developed by AJAX and pioneered by CLEVITE will attain a lining life of one year with bronzes of substantial lead content. Electromagnetic stirring assures uniform alloy and close temperature control. Compared to externally fired equipment, metal loss savings run into many thousands of dollars per year. Recently, several large producers of leaded bronze castings converted their foundries entirely to 60 CYCLE INDUCTION MELTING.

While this is one of the most difficult metals to handle, the advantages of 60 CYCLE INDUCTION MELTING stand out today wherever copper alloys are melted. As specialists in 60 CYCLE INDUCTION MELTING, we have developed furnace types to best fill each application.

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ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

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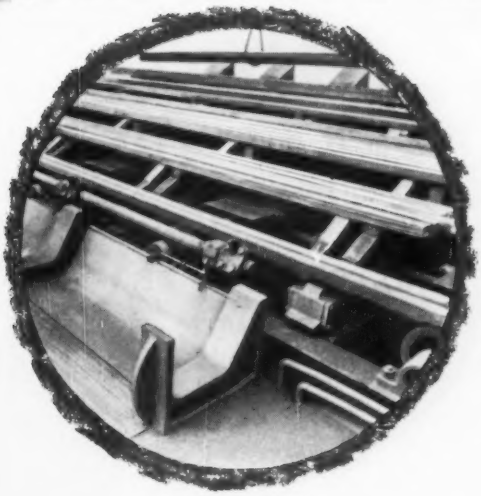

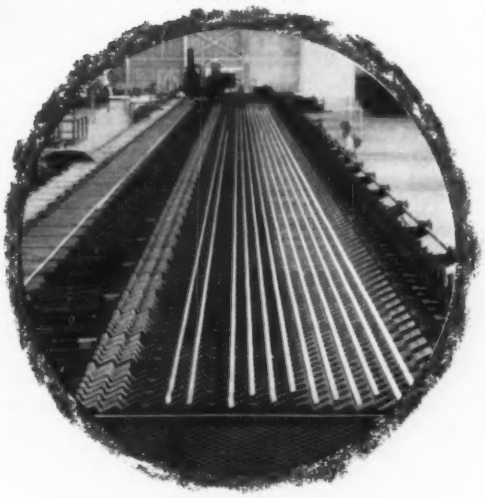

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RM-77

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A leading manufacturer of subminiature, small industrial and commercial, and precision electric switches recently specified Armco 17-7 PH Stainless Steel for the center blades and patented rolling springs in many of their products. A non-ferrous spring material was replaced with 17-7 PH Stainless because its unusual characteristics offered the opportunity to improve the reliability and performance of their switches at low cost. The mechanical life of one part was increased from 30,000 to 30,000,000 cycles!

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Tensile yield strength of 190,000 psi
Fatigue strength of about 85,000 psi at 10^7 cycles
Good corrosion resistance, much superior to that of the hardenable chromium grades of stainless steels.

Where even greater strength is needed, Armco 17-7 PH hard temper (Condition C) sheet and strip can be heat treated to a typical ultimate tensile strength of 265,000 psi. And, if parts require extensive fabrication, they can be easily formed from annealed 17-7 PH then hardened to high strength and hardness.

Improve the reliability and performance of your products by using 17-7 PH Stainless Steel for parts that require high strength and hardness up to 900 F, good corrosion resistance, and excellent fabricating characteristics. Armco 17-7 PH is available in sheets, strip, plates, bars, and wire; a companion grade, Armco 17-4 PH in bars, wire, and billets.

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Who Is Bluffing— McDonald or the Industry?

The steel industry and the union have had their initial blasts at each other via press releases. It is too early to get the reaction from the public. But eventually the entire issue must be settled at the bargaining table.

Steel firms are pretty clear that they are against any increase in wage costs—or prices. Spelled out, that means no increase in wage rates, fringe benefits or any other wage costs.

Union chief Dave McDonald insists that the steel companies grant wage and fringe benefits. He says profits will allow it and the workers have earned it through productivity gains.

Obviously, Dave is trying to tell the steel firms what they ought to do with their profits. This, of course, is none of his business. Steel firms' profits are the business of their officers and their stockholders.

Wooing the public is a tough job for the steel industry. The "people" have their own problems. They are worrying about more money for themselves, how many more payments they have to make on the car, and about "other stuff." They worry, too, about their kids and why they don't do as they are told. So maybe neither Dave nor the steel firms have "reached" the public—yet.

Before this steel labor hassle is over there will be a lot of emotional outbursts and what are usually called hasty generalizations. One of the latter might be that because steel company earnings are high Dave ought to be able to write his own ticket—with steel prices staying where they are. But that's nonsense.

This year steel companies have finally tumbled to the fact that no one is ever going to help them stop the yearly wage increases except themselves. Sooner or later they had to reach this solemn conclusion. And it is solemn because it could mean a long, bitter, and costly strike for the sake of basic principles.

Many steel users and people outside the metalworking industry believe that the steel firms are bluffing. Looking at past settlements, they feel that when the window dressing is over, both sides will huddle and quickly make a deal resulting in a wage increase and a price increase.

Probably one of those who feels this way is Dave McDonald. After all, he has about had his way for years. But this time it's different.

The steel industry isn't bluffing. It isn't going to be a party to inflation if it has anything to say about it.

Tom Campbell

Editor-in-Chief

MAINTENANCE WORK ORDER
Date 3/3/59
Order No. 9874
Building No. 2
Description and Location
Replace shafting on machine No. 4 (see blueprint attached)
Repair gallery in Bay No. 2
Repair P_2SO_4 supply line (corroded)
Replace safety plate receiving dock G
Replace 100' corrugated galvanized siding south areaway
Replace welded grating in foundry
Replace machine guard in compressor room
MATERIALS:
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Cold Finished Shafting—Ryerson stocks of t g & p bars provide a ready source for shafting of outstanding size accuracy, straightness and concentricity.

Expanded Metal—Ryex® expanded metal—light, strong, rigid . . . easy to handle—all sharp edges removed. Two types: standard and flattened.

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Safety Plate—Inland 4-Way® Safety Plate in two pattern sizes for flooring, stairs, ramps, platforms. Provides plenty of traction. Easy to install, maintain.

Welded Grating—stock-size panels, or tailor-made for your job with all necessary cutouts and banding. Furnished galvanized or painted.

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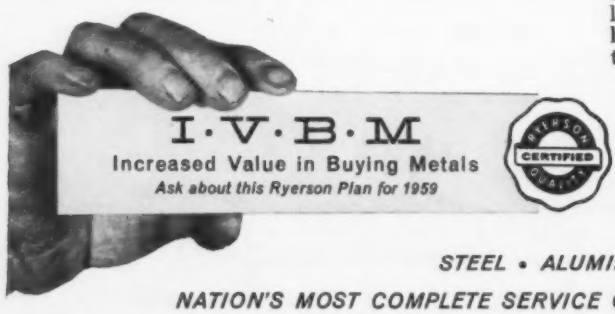
These and all other maintenance steels cut to your most exacting specifications—are available from the world's largest stocks at Ryerson. Save time, money, space . . . help your maintenance crew finish faster and have more time for preventive maintenance. Call Ryerson.



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Gear Deburring at Low Cost

Designed to cure one of the biggest headaches in gearmaking, a new deburring machine uses a coated-abrasive wheel. It consists of hundreds of die-cut leaves of coated-abrasive cloth bonded in a radial pattern. In a few seconds—less than a minute for many gears—it removes all traces of even the tiniest burrs. Variable timing and feed controls allow it to put a chamfer on the entire tooth profile, including root and fillet sections.

Increase Refining Capacity

A new method increases the volume of material that can be purified in floating zone refiners. At the same time, it also treats thinner cross-sections than have been feasible before. The key to overcoming previous limitations is in a cross section, thin enough to permit fast melting, yet wide enough to increase total area treated.

Refractory Graphite Cloth

Soon to be announced is a process for direct conversion of organic textile fabrics into flexible graphite cloth. One potential use now being tested is as a reinforcing agent for plastics and refractory materials to boost high-temperature resistance. The new fabrics have excellent thermal and electrical conductivity, and being flexible are immune to thermal shock.

Effect of Strike Talk

Merchants in steel centers say strike talk is having a depressing effect on business. But United Steelworkers say no directive on spending has gone out. However, retail outlets feel individual workers are waiting for a settlement before they start spending current high earnings.

Fusion Repair Saves Valves

By reclaiming worn and eroded engine exhaust valves during engine overhauls, the Navy has saved nearly $2 million. A fusion-bonded nonporous hard surface is applied to stainless steel valve stems at a cost of less than $6 each. Replacement cost is $42 per valve. With 18 valves per engine, savings are over $600 per engine overhaul. The overlay protects against wear where stems come in contact with guides and guards against erosion by escaping high-velocity combustion gases.

To Replace Transistor?

Described in a new laboratory report is the solion, the Navy's electrochemical device that bids to replace the transistor in many electronic uses. The unit is highly sensitive to low-energy stimuli and requires 100 to 1000 times less power than transistors. Other features are stability, long life, light weight and ease of manufacture.

Plasma Jet for Spectroscopy

A modified plasma jet is going through trials as a spectroscopic source. Producing temperatures up to 8000°C, the modified jet will vaporize a solution of the test specimen. The excited elements will emit spectra not ordinarily obtained at lower temperatures with chemical flames. In tests on stainless steel, major constituents were determined with a 2-pct coefficient of variation.

Machine Honeycomb Core

A machine cutter head machines compound contour structural shapes from honeycomb core material. It does the job without need for filler to make core rigid. A stylus rides the surface of a wooden or plaster model to transmit rise, fall and tilt motions to the cutter head.

High-Temperature Surfacing

Now under test is a high-temperature, soft coating developed for gas turbine shrouds. It's a heat and corrosion resistant alloy applied as a sintered material. Early test results by a leading gas turbine maker look promising. This may be the development to break down one of the barriers to automotive turbines.

Did a two-belt job handling red-hot coke

You'd look a long time to find a tougher conveyor job: tonnage is heavy—coke is highly abrasive—it's handled glowing hot—and it's side-loaded on the belt, an invitation to uneven wear. So, all things considered, management wasn't too unhappy with a 700,000-ton average from belts at this big steel mill's coke plant.

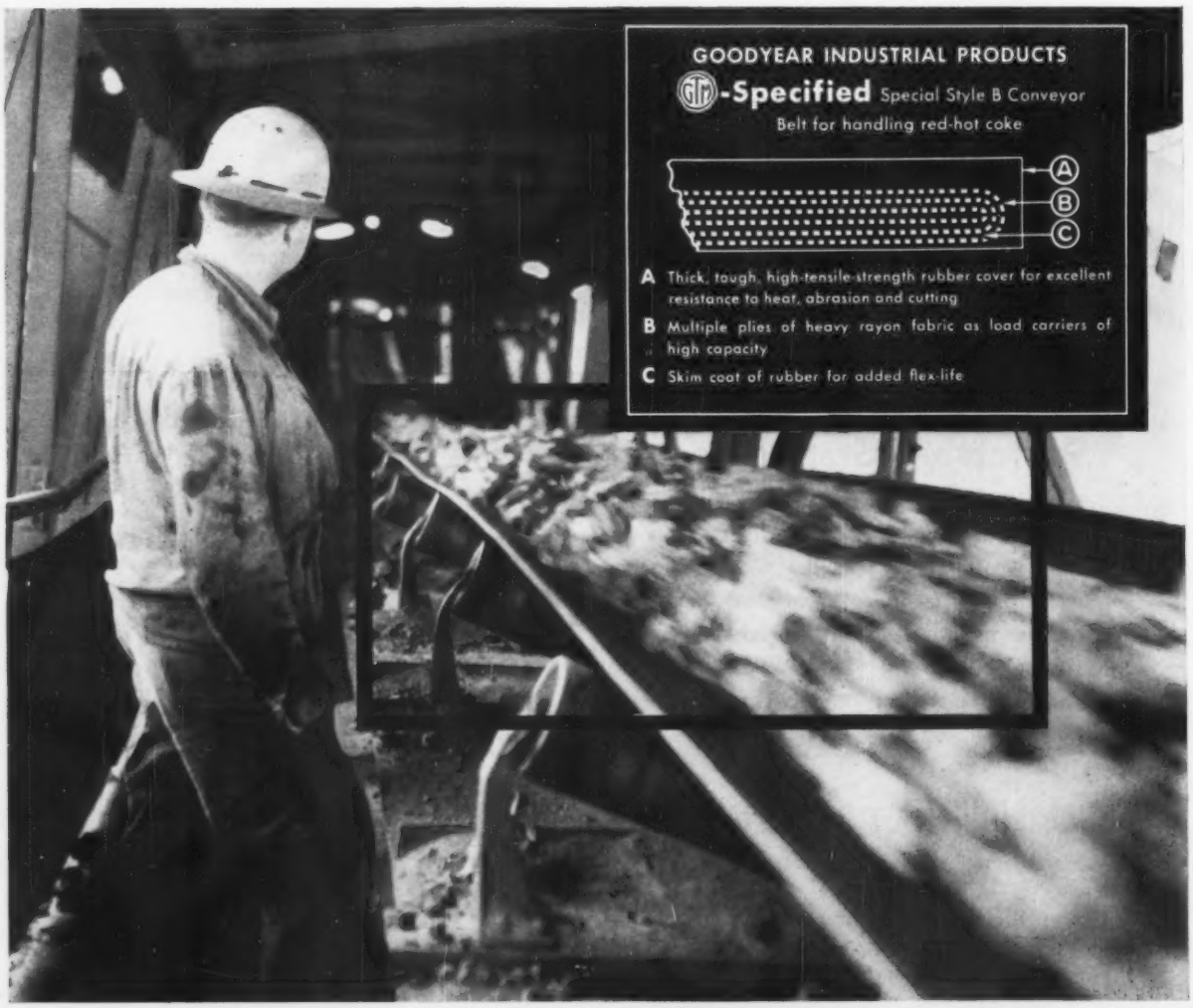
But the G.T.M.—Goodyear Technical Man—knew he could do better than that. His recommendation: a special Style B conveyor sinewed with plies of heavy-duty rayon to defy the abusive service.

And he was right again! In fact, the G.T.M.'s belt hustled almost 1,500,000 tons—better than twice the average of those previously used. And because it troughed better and trained more readily, it proved far easier to reverse for more equalized wear—held its fasteners better—needed less maintenance all around.

And that's just one more case where the G.T.M. had the answer—where competition had fallen far short. To put him to work on your problem, contact your Goodyear Distributor—or write Goodyear, Industrial Products Division, Akron 16, Ohio.

• • •

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and non-rubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*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B
C
A Thick, tough, high-tensile-strength rubber cover for excellent resistance to heat, abrasion and cutting
B Multiple plies of heavy rayon fabric as load carriers of high capacity
C Skim coat of rubber for added flex-life

CONVEYOR BELTS BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Storage Plus

Through the years steel warehouses have consistently tried to provide more and better service for their customers. As a result they have asked for—and earned—the title "steel service centers."

That's why in this issue, just in advance of the American Steel Warehouse Assn. annual convention in Chicago, May 3-6— we're proud to salute the industry. Doubly so since this year also marks the 50th anniversary of the association.

We're contributing our bit with two articles—each showing why warehouses merit the name "service centers." The first, on p. 63, describes how the distributors are getting ready in case of a steel strike. It outlines their efforts to build inventories and points out what customers can expect if there is a strike.

The second article, on p. 101, shows—by way of a word journey through the modern Precision Steel Warehouse in Franklin Park, Illl—just how the distributors have mechanized to better serve customers.

So a deep bow to our nation's warehouse—er, we mean steel service center, industry.

Author, Author

Writing a book on metallurgy? It may pay you to get in touch with the book division of IRON AGE's parent Chilton Company. The division has set up a Chilton series of books on metallurgy and metallurgical engineering.

The new series has been planned to cover the various areas of undergraduate and graduate metallurgy and metallurgical engineering instruction. Textbooks will be supplemented by other books on metallurgical science and engineering designed to keep technical graduates abreast of recent developments and permit continued education.

Consulting editor for the series is Dr. Joseph F. Libsch, professor of metallurgy at Lehigh University.

Very Dry Martini

How do you send a martini through the mail?

It isn't easy, but Seymour Manufacturing Co. found a way. To celebrate the company's entry into stainless steel production after 80 years of nonferrous metal manufacture, it held a press party by mail.

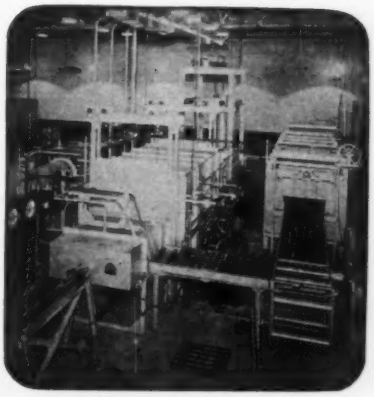
What's more, it sent along a plastic envelope. True, it looked suspiciously empty. But, Seymour advised, it "contained an unlimited number of dehydrated martinis."

This procedure was recommended: Pour the contents into a pitcher, add ice cubes, gin, and a dash of dry vermouth. Stir slowly for several seconds and taste. Add gin. Sit down. Wait two days. Read the press releases. Look at the pictures. Then write a cover story on Seymour's stainless steel.

Adds Seymour, "If you can't stand martinis, write for one of our dehydrated old-fashioneds—they're out of this world!"

"Oh, there you are Cazooski, I'd like you to meet my son."

LABOR SAVED 50%
PRODUCTION UP 50%



R-S . . .
CONTINUOUS HARDENING, QUENCHING, DEGREASING, DRAWING LINE

It's one operation instead of four to heat treat cylinder liners at Continental Motors with the R-S equipment. Electric heat treating line is one complete unit ...temperature is 1575° F. for hardening, it is oil quenched and the draw furnace operates at 1100° F. The atmosphere is controlled through hardening and quenching operations and capacity is 1,300 gross lbs. per hour.

R-S Heat Treating unit requires only two men instead of four with the conventional type. Production rate is up 50% . . . quality is uniformly high . . . and the unit paid for itself in 22 months.

Why not put these savings into your heat treating? Write today for your copy of the booklet on better heat treating. Ask for R-S 200. No obligation.

R-S FURNACE CO., INC.
North Wales, Pa.

Car Hearth Furnaces
Continuous Furnaces
Rotary Type Furnaces

R-S FURNACES

How COMMERCIAL'S "Die Bank" cut component unit cost from $8.49 to $2.59

Wheel covers are important components in the four-wheel drive, aircraft towing tractors manufactured by the American Coleman Company. Because the tractor's front and rear wheels are both steerable, a sturdy, dished-out, custom-produced cover was required to fully protect the wheel enclosed mechanism against possible damage from stones and debris.

Full consideration was first given to producing the covers as stampings. Low quantity requirements and the high cost of special tooling ($2,300), however, made the unit cost prohibitive.

The first wheel cover was finally produced as a machined, malleable iron casting at a unit cost of $8.49, plus a pattern charge involving $200. A unit cost reduction to $3.50, plus a $250 chuck cost, was later effected by hand spinning the covers.

Still seeking to reduce unit costs even further, American Coleman discovered and investigated COMMERCIAL'S "Die Bank" facilities.

The result: By using forming dies from COMMERCIAL'S "Die Bank" of almost 50,000 different die components, tooling costs amounted to just $80 —instead of the $2,300 originally estimated for new dies. The unit cost of each cover now custom stamped by COMMERCIAL is only $2.59.

For more complete information on COMMERCIAL'S "Die Bank" write to Commercial Shearing & Stamping Co., Dept K-17, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

SPECIALISTS IN THE SHAPE OF THINGS TO COME

LETTERS FROM READERS

Capital Spending

Sir—We appreciated your latest IRON AGE Special Survey Report to Management on Metalworking Capital Appropriations.

Do you have more copies available so that we can make a mailing to our machinery dealers who number about 300? We would like to have at least 25 copies to send to our salesmen. This is a very fine report and very nicely done.—L. H. Russell, Sales Mgr., Walker-Turner Div., Rockwell Manufacturing Co., Pittsburgh.

▪ Previous requests for this article have reduced our supply of reprints. However, a limited number are still available.—Ed.

Call for Help

Sir—During World War II a large amount of various types of material came into Australia including a quantity of G.M.C. Canadian Scout Cars, about 1942 models. These units were ultimately turned into mobile cranes in Australia and now there is a regular demand for spare parts, especially gear boxes.

We are particularly interested in four speed, complete gear boxes (possibly from salvaged material) to suit this G.M.C. Scout Car, which is a 6 x 6.—W. B. Higgins, Director, Steels And Metals, Pty. Ltd., Railway Siding, North Carlton, Melbourne, Victoria, Australia.

▪ Perhaps some of our readers could help—Ed.

More About Ductile

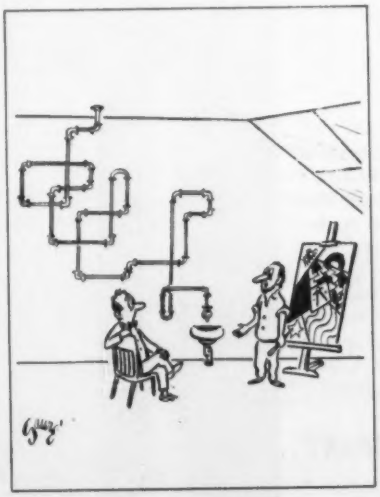
Sir—I read with interest the discussion which took place between Professor Schaller and the International Nickel Company regarding the question "to whom we owe the discovery of ductile cast iron, cast iron with spheroidal graphite" (Feb. 19 issue).

I regret I cannot agree to both the opinions mentioned. I should like to draw your attention to the correspondence already made on this subject in your own journal some years ago. (See The IRON AGE, May 19, 1949.)

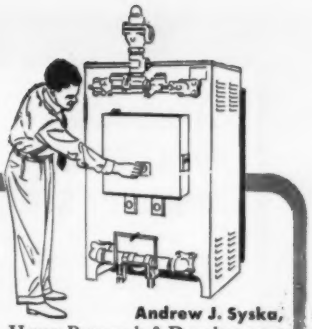
From this you can clearly see the discovery of cast iron with spheroidal graphite is due to Dr.-Ing. Carl Adey, Germany, who applied for a German patent in 1938, for the production of cast iron with spheroidal graphite.

Professor Piwowarsky, an outstanding foundryman, pointed out this invention in a book published in 1942. Because of World War II Dr.-Ing. C. Adey could give only details in 1947 about his development at an international meeting.

Please do not interpret these statements as a detraction on the excellent work of our English and American colleagues, of the British Cast Iron Research Association, and the International Nickel Company. These statements should only be useful in recalling the history of ductile cast iron as a part of the elaboration of cast iron alloys.—A. Wittmoser, Doctor of Engineering, Rheinstahl Eisenwerke Gelsenkirchen Ag, Gelsenkirchen, Germany.



"Certainly I did the plumbing myself. Why do you ask?"



Andrew J. Syska,
Hayes Research & Development Engineer Reports . . .

KNOW-HOW IS VITAL IN GAS AND LIQUID DRYING

When we developed the Molecu-Dryer®—a unit specially designed to take advantage of the remarkable drying, sweetening, and purifying capabilities of Linde Company's Molecular Sieves—our chief interest was in drying protective atmospheres (hydrogen, dissociated ammonia, etc.) for metallurgical work—to dewpoints well below –100°F. A natural outgrowth of the Molecu-Dryer was the *Nitro-Gen*®—an automatic cycling generator which produces low cost, high purity nitrogen for blanketing, purging, protecting. Our engineering people have also explored whole new worlds of gas, liquid, and atmosphere drying and separating problems.

NEW DRYING NEEDS APPEAR DAILY

In manufacturing transistors, for example, the Molecu-Dryer has been able to effect big economies by supplying moisture-free air in place of tank nitrogen to protect transistor assembling and sealing operations. Other current projects: instrument air drying, gaseous CO_2 drying, gas separating . . . also drying and separating of liquid or gaseous hydrocarbons.

EQUIPMENT DESIGN IS DYNAMIC!

Each new area of work has necessitated engineered application of standard or special Molecu-Dryer models, to provide optimum adsorption efficiency, top capacity at minimum equipment cost, job-coordinated cycle times, and fast desorption and cooling.

For a comprehensive picture of the Molecu-Dryer, write for Bulletin 5703.

*Hayes TM

C. I. HAYES, INC.
821 Wellington Avenue • Cranston 10, R. I.
Established 1905

It pays to see HAYES for metallurgical guidance, laboratory facilities, furnaces, atmosphere generators, gas fluid dryers.

STANDARDIZE WITH VERSATILE AMBALLOY STEELS

There are a lot of reasons for standardizing with Amballoy—personalized steels from Byers. The most important is that you *save money*.

Here's how. First: the very versatility of Amballoy enables you to reduce your necessary chemistries to one or two. Second: through heat treating, you can match this metal to your most exacting physical characteristics.

It's an ideal way to increase your "internal revenue." Metal-users who standardize on Amballoy shrink unproductive capital. Their inventories and special handling and processing costs are drastically reduced. There's more to the story. And the Byers metallurgist has it. Let him show you how Amballoy steels can qualify as the workhorse material for your critical applications.

For further information and the name of your Steel Service Center stocking Amballoy, write or call: Manager of Steel Sales, ATlantic 1-8110, A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

SAVE THROUGH YOUR STEEL SERVICE CENTER

The savings are very real.

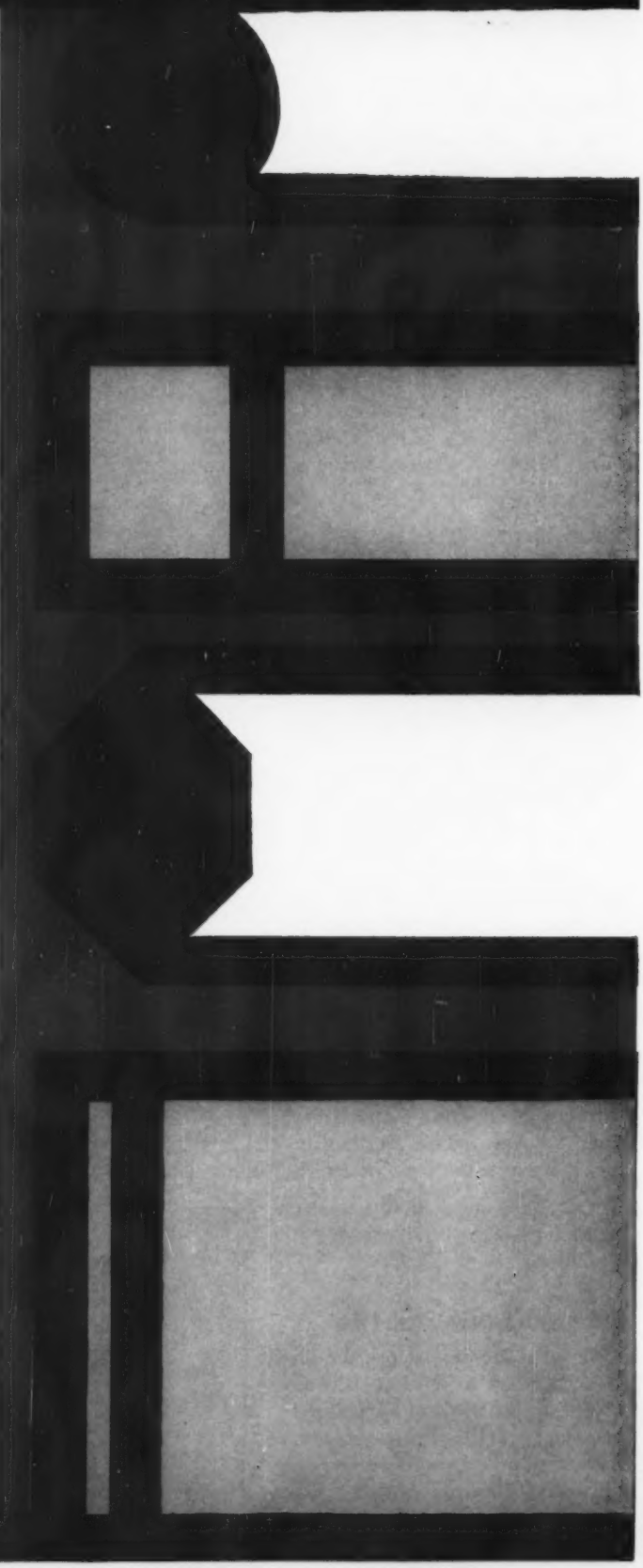
Your Steel Service Center is manned, equipped, stocked and located to serve you metal-users at a fraction of what it would cost you to serve yourselves. Consider the advantages, the savings in letting your Steel Service Center distributor carry the vast inventory. Let him meet those 24-hour commitments. Let him do the slitting, flame-cutting, sawing, shearing. Let him pay for the space and manpower to do it.

That's his business. He's an old pro at it. So let him roll with the market's uncertainty. Let his capital, his equipment, his record-keeping assume the b-unt of today's high operating costs. Let him process your order for Amballoy steels.

And when you need help in standardizing on the *right* alloys for your requirements, write or call *us:* ATlantic 1-8110, A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

A. M. BYERS COMPANY

AMBALLOY ELECTRIC FURNACE QUALITY STEELS



COMING EXHIBITS

Coal Show — May 11-14, Public Auditorium, Cleveland. (American Mining Congress, 1200 18th St., N. W., Washington 6, D. C.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show—June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Finishing Show — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

Instrumentation Show — Sept. 21-25, International Amphitheatre, Chicago. (Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.)

Metal Show—Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

APRIL

Scientific Apparatus Makers Assn.—Annual meeting, Apr. 25-30, The Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, 20 N. Wacker Drive, Chicago 6, Ill.

The National Screw Machine Products Assn.—Annual meeting, Apr. 26-30, Roosevelt Hotel, New York. Association headquarters, 2860 E. 130th St., Cleveland 20.

Steel Boiler Institute, Inc.—Annual meeting, Apr. 27-28, Sheraton-Park Hotel, Washington, D. C. Institute headquarters, 1308 Land Title Bldg., Philadelphia.

Association of Iron & Steel Engineers—Spring conference, Apr. 27-29, Hotel Statler, Buffalo. Association headquarters, 1010 Empire Bldg., Pittsburgh.

(Continued on P. 16)

HOT SPOT in *your* plant?

Chances are 1 in 3 that your plant will have an electrical fire this year. Here's how to guard against it.

In a recent nationwide industrial survey, 29% of the reporting plants had one or more electrical fires during the past two years. Best protection against larger electrical fires? Install a fully-automatic Kidde carbon dioxide fire extinguishing system.

Finest fire protection on the market today, Kidde systems give you 24-hour-a-day protection, act quickly, dependably at the first sign of fire. Kidde systems are pressure-operated, self-contained – need no outside power. Visual indicators show if system is "set" or "released." All parts can be tested without discharging system. No parts to replace after operation or test. All operating parts completely enclosed for safety. Fast, clean carbon dioxide snuffs fire in seconds, then vanishes. Leaves no mess to clean up later, can't harm electrical gear. For more information, write for Kidde's Pressurized Systems booklet today.

Kidde (K Kidde) **Walter Kidde & Company, Inc.**
449 Main St., Belleville 9, N. J.

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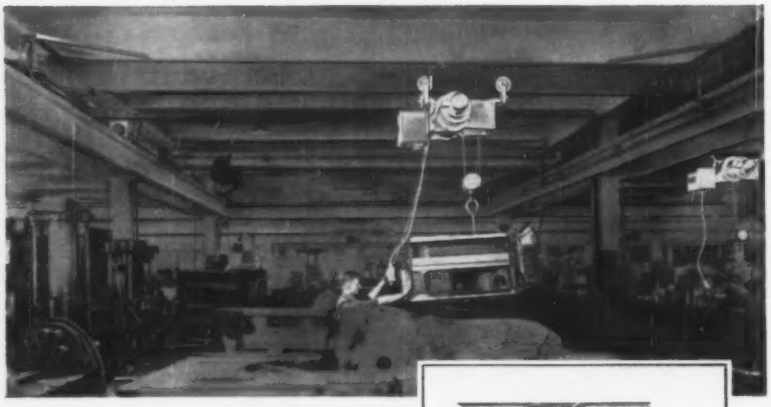
The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freeze' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

SHEPARD NILES HOISTS

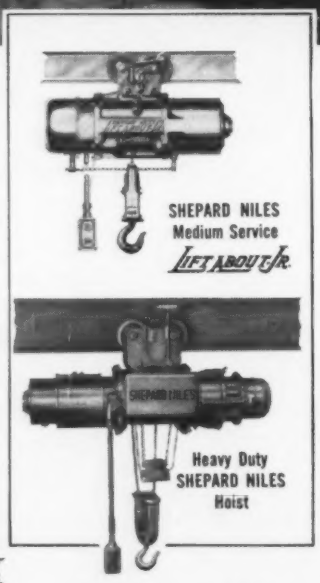
LIFT LOADS

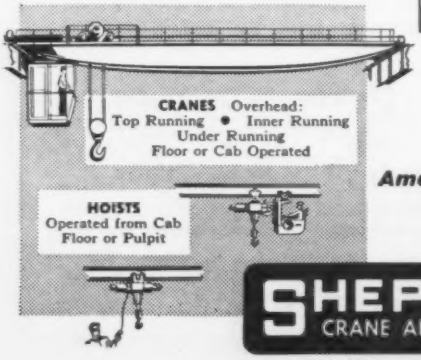
long after they're written off



LOOK FOR YEARS of dependable, trouble-free lifting when you invest in a Shepard Niles Hoist. Because Shepard Niles builds hoists that go on lifting long after you've written their original cost off. This is the kind of performance you expect and get with a Shepard Niles Hoist.

Investigate the complete line of Shepard Niles Hoists . . . choose from medium and heavy capacities with slow, medium or fast speeds. Built for cycle duty, heavy intermittent duty, medium duty and light-occasional service. Short to long lifts, standard or close headroom, manual or magnetic controls.





• Write for latest Bulletin showing Shepard Niles Hoists . . . and request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

1483 Schuyler Ave., Montour Falls, N. Y.

EXHIBITS, MEETINGS

(Continued from P. 15)

National Machine Tool Builders' Assn.—Spring meeting, Apr. 30-May 1, Hotel Statler, Detroit. Association headquarters, 2071 E. 102nd St., Cleveland.

MAY

American Steel Warehouse Assn.—Annual meeting, May 3-6, Drake Hotel, Chicago. Association headquarters, 540 Terminal Tower, Cleveland.

Air-Conditioning & Refrigeration Institute—Annual meeting, May 3-6, The Homestead, Hot Springs, Va. Institute headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

Rail Steel Bar Assn. — Meeting, May 3-6, Grove Park Inn, Asheville, N. C. Association headquarters, 38 S. Dearborn St., Chicago.

The Electrochemical Society, Inc.—Spring meeting, May 3-7, Sheraton Hotel, Philadelphia. Society headquarters, 1860 Broadway, New York.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, May 11-14, Williamsburg Inn, Williamsburg, Va. Association headquarters, P. O. Box 175, Pompton Plains, N. J.

Porcelain Enamel Institute—Mid-year conference, May 13-14, Edgewater Beach Hotel, Chicago. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

American Supply & Machinery Mfrs. Assn., Inc.—Annual triple industrial supply convention, May 13-15, Dallas, Texas. Association headquarters, 2130 Keith Bldg., Cleveland.

American Institute of Chemical Engineers—National meeting, May 17-20, Muehlebach Hotel, Kansas City, Mo. Institute headquarters, 25 W. 45th St., New York.

Accurate Springs seal the goodness in

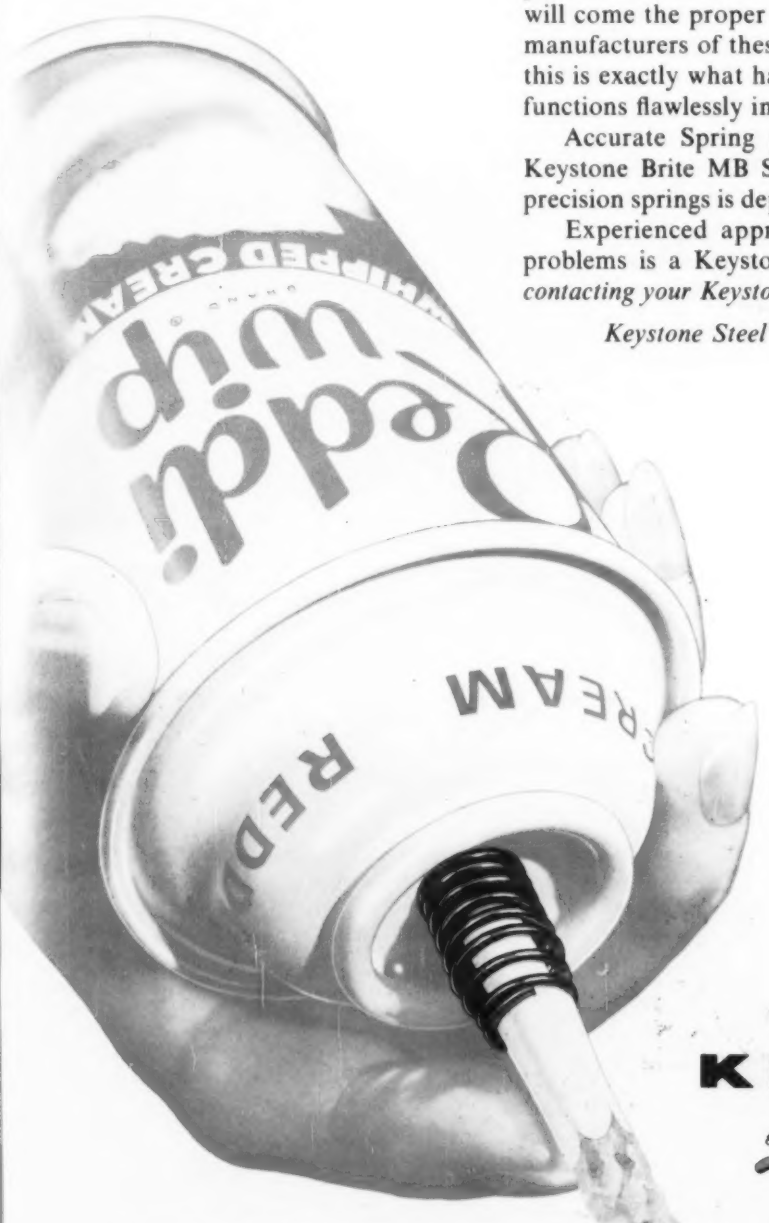
Accurate Spring Mfg. Co., Chicago, Ill. depends on Keystone Wire for millions and millions of springs that go into manufacture of "Reddi Wip" cans.

Mrs. Housewife takes it as a matter of course that when she presses the nozzle on a can of "Reddi Wip" whipped cream, out will come the proper amount of delicious whipped cream. The manufacturers of these modern dispensers have made sure that this is exactly what happens, by designing a small spring which functions flawlessly in this application.

Accurate Spring produces millions of these springs from Keystone Brite MB Spring Wire. This high production run of precision springs is dependent on absolute uniformity of the wire.

Experienced appraisal and prompt solution to your wire problems is a Keystone specialty. *This service can be yours by contacting your Keystone Representative today!*

Keystone Steel & Wire Company, Peoria 7, Illinois



This spring must have exactly the right degree of stiffness, yet flex easily and have "sales-appeal" appearance. Keystone Wire meets these strict requirements for uniformity, correct resiliency and good plating quality.

KEYSTONE MB SPRING WIRE WIRE STUDY

KEYSTONE

WIRE FOR INDUSTRY

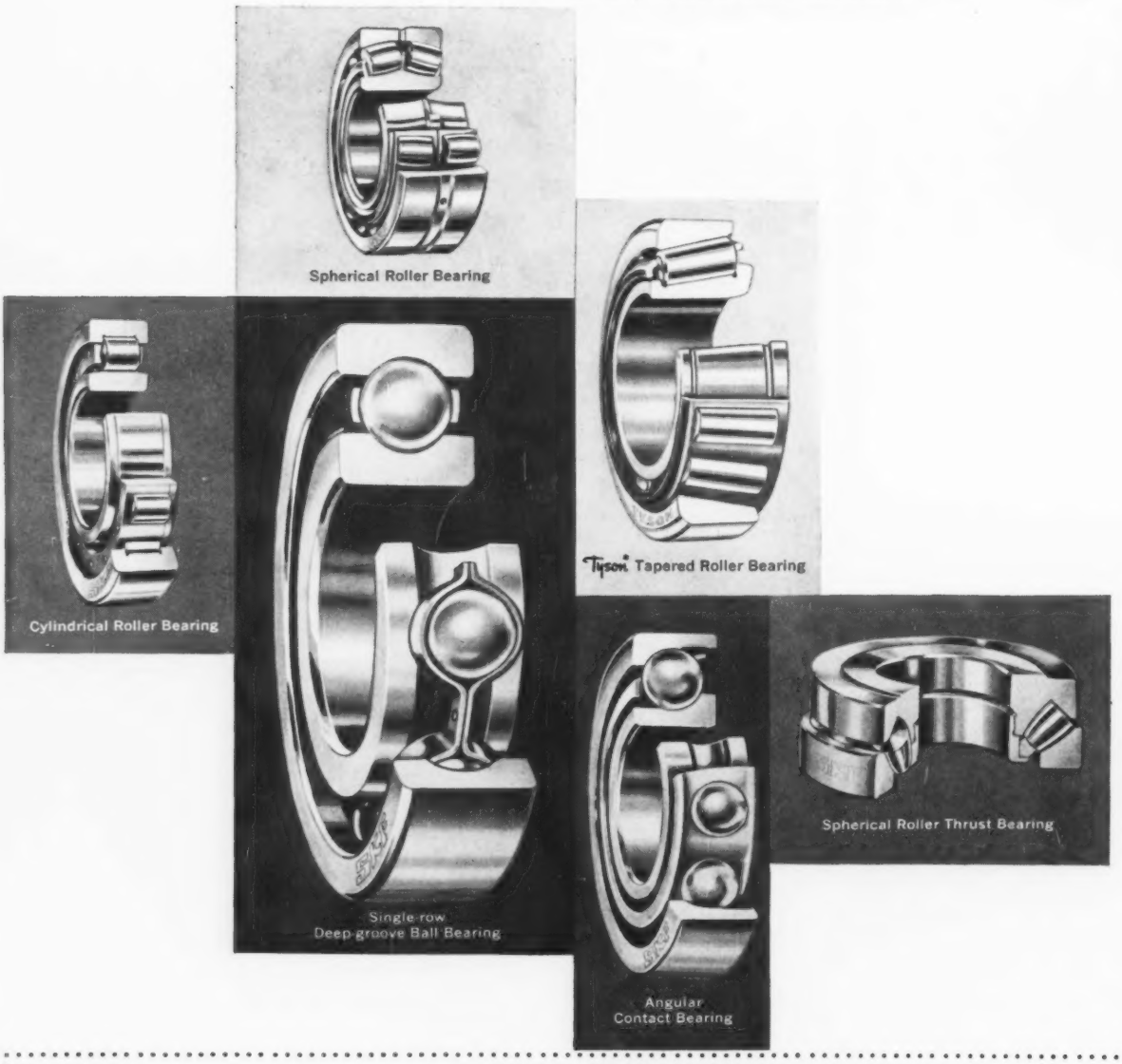
What qualities should a "production" bearing have?

Take a single-row deep-groove bearing, for example.

As SKF makes it, the type shown here sustains heavy radial load—as well as thrust load in either direction—it can be used at normal speeds with grease lubrication or at high speeds with oil. *Yet it is a standard SKF bearing.*

We even mass-produce some sizes of this particular bearing at our automated Altoona (Pa.) plant. You can buy quickly and economically. There are over 100 sizes ranging from over ⅝" O.D. to almost 16" O.D., with various seal, shield and snap-ring combinations.

But why not compare the quality, availability and price of this SKF bearing (or any of the other SKF products) with those you now use? For details, just call any of the 25 SKF sales offices. 5916



Spherical, Cylindrical, Ball, and Tyson Tapered Roller Bearings

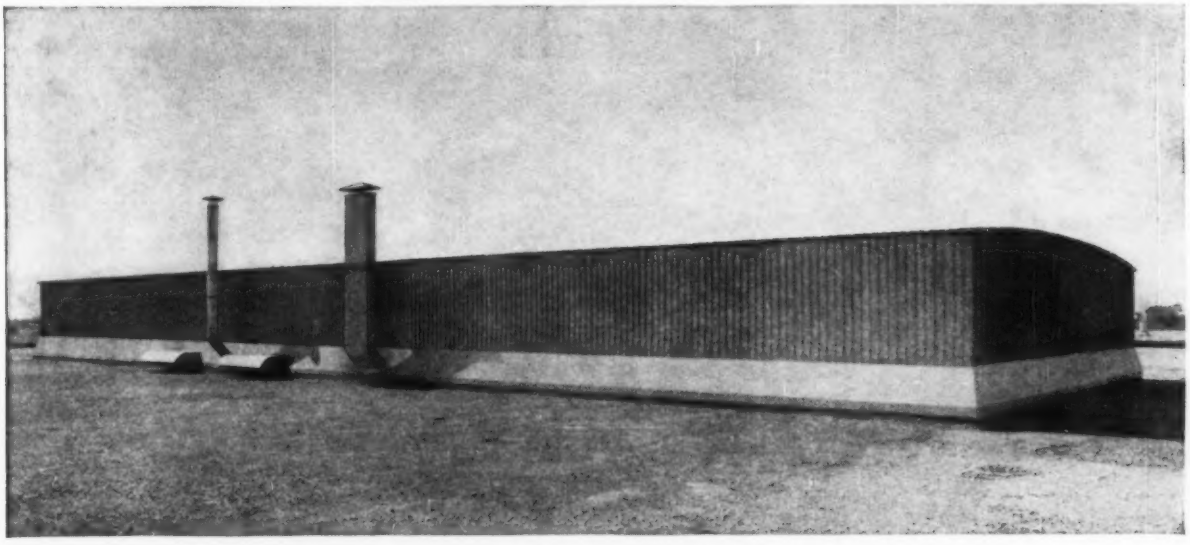
EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

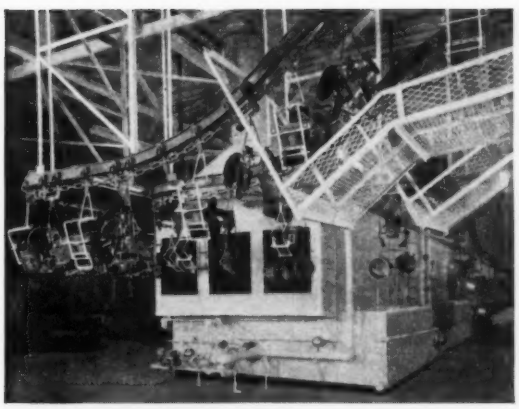
*REG. U. S. PAT. OFF.

Processing EQUIPMENT...



Mahon Dehydrating Oven with Controlled Dew Point Installed on the Roof of the Copeland Plant, Sidney, Ohio.

COMPRESSORS are Dehydrated, Sealed, Inspected, Tested, Painted, and Charged with Refrigerant on ONE CONTINUOUS CONVEYOR PRODUCTION LINE!



Mahon Three Conveyor Line Two-Stage Metal Parts Cleaning Machine—Another Unit of the Compressor Processing Equipment Installed at Copeland Refrigeration Corporation, Sidney, Ohio.

The High Temperature, Low Dew Point Dehydrating Oven illustrated above is part of the modern straight-line production facilities for processing Compressors in the Copeland Refrigeration Corporation's plant, Sidney, Ohio.

When you need Processing Equipment or Special Production Equipment of any kind, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the initial planning and engineering of equipment that will produce the desired end result at minimum cost per unit processed.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

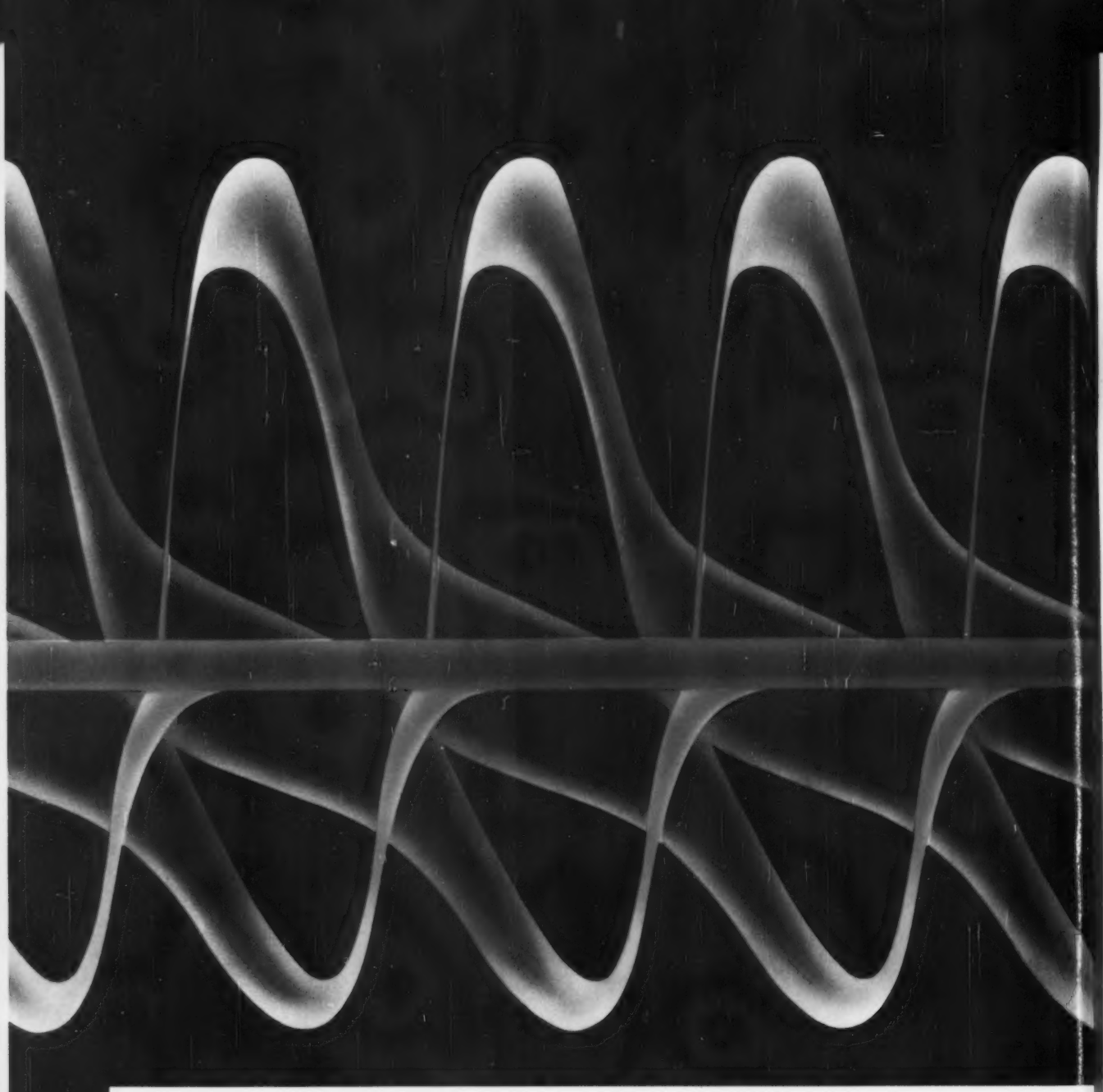
Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Manufacturers of Complete Conveyorized Finishing Systems: Metal Parts Washers, Metal Cleaning and Rust Proofing Machines, Conveyorized Cleaning and Pickling Machines; Dry-Off Ovens, Spray Booths, Electrostatic Spray Enclosures, Flow Coaters, Dip Coaters, Finish Baking Ovens, and Paint Stripping Equipment; Core Ovens, Soldering Ovens, Dehydrating Ovens, Heat Treating and Quenching Equipment for Aluminum and Magnesium; Dust and Fume Control Installations, and Many Other Units of Special Plant and Production Processing Equipment.

See Sweet's Plant Engineering File for Information and Representative Installations, or Write for Catalogue A-659

. . . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

MAHON



The cathode ray oscilloscope is one of science's and industry's most perceptive instruments for determining uniformity of operation. The pattern reproduced here is a harmonically modulated sine wave of exact uniformity.

Uniformity is Malleable

Just as the input of an oscilloscope can be controlled to produce repetitive patterns, so can consistently uniform metal parts be produced with Malleable iron because of modern, scientific controls. The unique method by which all Malleable castings are made and the exacting techniques employed by Malleable foundries assure Malleable users of castings that are uniform, part after part, regardless of size or shape. This uniformity, combined with unparalleled physical and mechanical properties, ideally suits Malleable castings for modern America's quality products.

For information or service, call on one of the progressive firms that identify themselves with this symbol—

MEMBER

MALLEABLE

CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

Better Products at Lower Cost Result From Malleable Uniformity Controls

Uniform quality — whether for five or five million pieces — is essential to maintain product quality and increase manufacturing efficiency. With accelerating frequency, Malleable castings contribute their unique uniformity in critical applications where durable, reliable components are necessary.

Key to Uniformity is Control

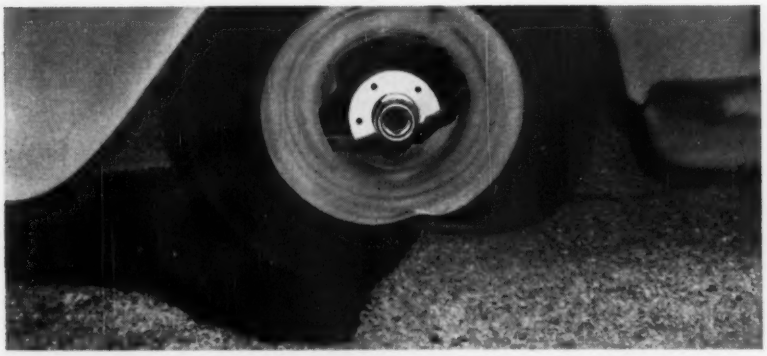
Malleable iron is produced under closely controlled manufacturing techniques. From charge composition and molding sand properties, through final inspection, every critical factor is held constant by using the most modern techniques of metal analysis, process control and inspection.

Internal Uniformity

This versatile engineering material is achieved through converting the base white iron into tough Malleable iron by a controlled heat treating process. Malleable's internal structure exhibits excellent uniformity, an important factor in assuring the dependable performance of intricately designed components.

External Uniformity

Fundamental to the casting process is the ability to produce a given shape, time after time, in either small or large quantities. Metal can be placed exactly where it is needed . . . eliminated where it is not. Good design — achieved through close cooperation between the customer and the foundry — can assure the necessary tolerances and the lowest possible finished part cost. Modern techniques of production and inspection are used to insure top quality, dimensionally accurate castings.



The life of every motorist rides in complete safety on Malleable wheel hubs of unerring uniformity.

Uniformity Proven by Use

The final test of any part is how well it stands up in actual service. Under continuous cyclic and shock loading, the millions of Malleable wheel hubs, which are in service on the front end of every American-made car, have compiled an enviable record of proven uniformity. Another dramatic example of Malleable's uniformity is proved in the old adage "A chain is only as strong as its weakest link." Miles of Malleable chain, carrying tremendous loads year after year without failure, demonstrate the uniformity of every cast link.

New techniques for controlling every element of Malleable production are the result of intensive research done by Malleable foundries in their continuing search for ways to make Malleable even more versatile and indispensable to industry.

More Information Available

Your copy of *Data Unit 103—Uniformity* — is available from any member of the Malleable Castings Council. If you prefer, write direct to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

WHO FORGES THE TOUGH ONES?...
and bores and machines them, too?

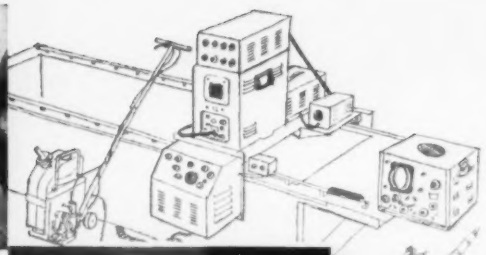
National Forge bored and machined these flanged tubes with such thin walls that the weight of a person's hand could change their dimensions. Yet throughout our machining, accurate close tolerances were maintained. An unusual machining job? A tough one? Yes ... but not for National Forge—where we've been forging and machining such tough ones for 40 years.

When your job requires the skills of real "specialists," call on National Forge. Get experienced handling of the complete job—from basic steel to finished product.

NATIONAL FORGE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

For more information on "the tough ones," and the machinery that makes them "best" write for bulletin NF-59-03



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The Image of CF&I...
maker of CLAYMONT
STRUCTURAL STEEL PLATE FABRICATIONS

This Image—a giant steelman—reflects CF&I's experience as a top-ranking primary producer of quality steels as well as CF&I's versatility as a fabricator of steel plate structurals.

Examples of the CF&I-Claymont line of structural plate fabrications are: all-welded structural sections, bearing assemblies, base and tie plates, truss and strut footings, wedges, gussets and straps. Claymont's completely modern Fabrications Shop is equipped to turn out these fabrications in all shapes, sizes and gages, from carbon, alloy or stainless-clad plates.

Welded steel girders up to 160 feet in length and nine feet in depth at their pier ends, weighing some 40 tons each, were produced by Claymont's Fabrications Shop for bridges at Schuylerville, New York...to mention a recent example. Massive CF&I-Claymont welded steel plate sections were also supplied for the Mianus River Bridge crossing of the Connecticut Turnpike.

For complete information on CF&I-Claymont Structural Steel Plate Fabrications, contact the CF&I sales office nearest you.

CF&I-CLAYMONT PRODUCTS: Carbon Steel Plates • Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Clay-Loy High Strength Low Alloy Plates • Flanged and Dished Heads • Manhole Fittings and Covers • Fabricated Steel Plate Products • Large Diameter API Pipe

Claymont Steel Products

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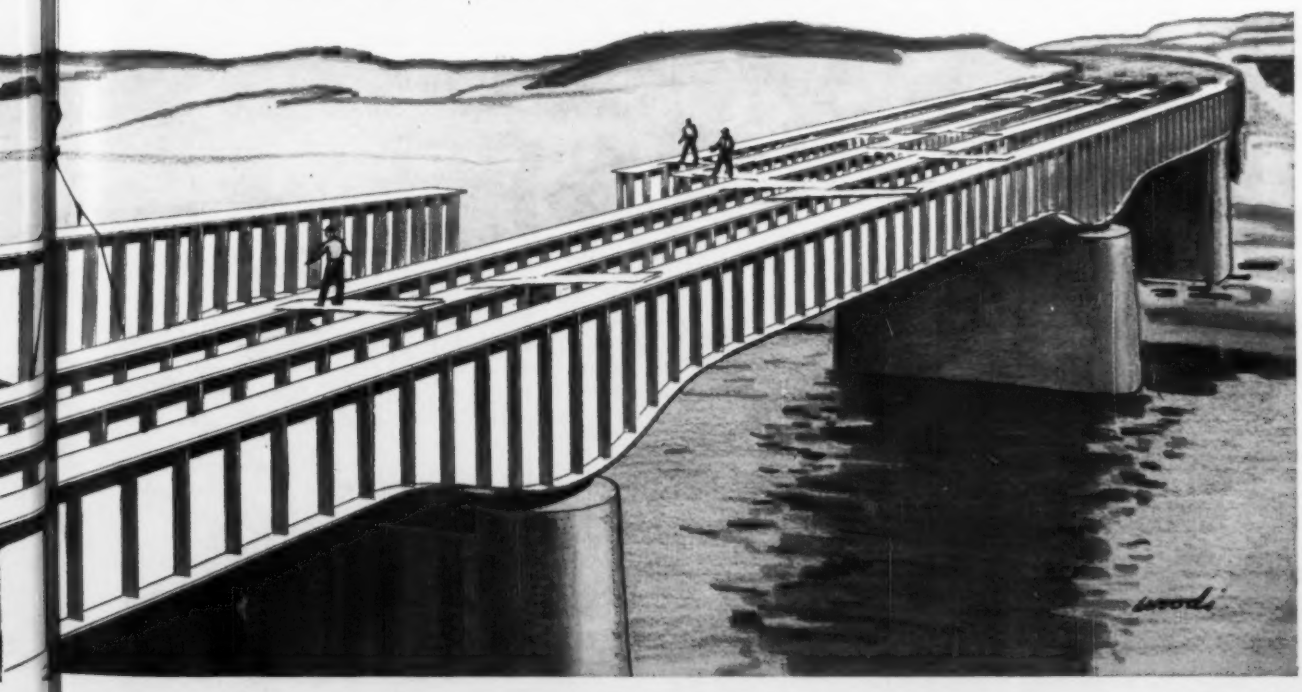
CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg 6598



Put your finger on the difference!

It pays to buy DoALL "TRIPLE DRAW" TAPS

H.S. STEEL GROUND THREAD

Complete stocks . . . special sizes

In addition to complete stocks of standard taps, we carry over 140 special taps ranging from No. 0 through 2″ diam. Included are all N.C. and N.F. left-hand, the National Extra Fine series, 8 pitch series over 1″ diam., and special spiral point sizes ⅝-11 and ¾-10 as well as .005″ oversize fractional sizes. Those below are typical.

Better performance . . . longer life

There's far more than meets the eye in comparing these taps. You'll find the difference in their *workability*. DoALL goes beyond the quality standard of double draw for all taps of ¼″ diam. and smaller—DoALL gives you "TRIPLE DRAW." This extra tempering operation further refines grain structure to insure added strength and wear resistance . . . extra toughness to withstand the increased torque on smaller tap bodies . . . greater protection against breakage.

Extra quality costs you nothing extra

When you buy DoALL "TRIPLE DRAW" Taps you get the finest, strongest, toughest taps on the market—with the stabilized grain structure that means *consistent quality* and longer life between grinds. Yet, they cost no more.

On your next order, try DoALL "TRIPLE DRAW" Taps and compare the performance. You'll be glad you did!

Fish Scale Proves Cleveland Tramrail Easy Rolling

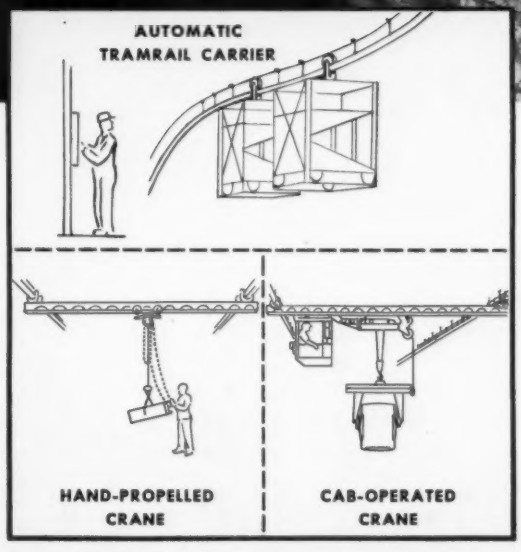
FOR decades Cleveland Tramrail has advertised the following guarantee covering all cranes and carriers it produces:

Guaranteed Starting Effort 15 lbs. and Running Effort 10 lbs. Per Ton Weight.

Recently a machinery manufacturer used a fish scale to check the pull required to move his hand propelled Cleveland Tramrail crane, which was loaded with a machine weighing 1750 lbs. The crane itself, including hoist carrier, weighed 913 lbs. The total load, therefore, was 2663 lbs.

The test indicated a pull of 12 lbs. was required to start the load and 10 lbs. to keep it moving. On the basis of ton weight moved, the starting effort was 9 lbs. and running effort 7½ lbs. Obviously, the test proved the soundness of Cleveland Tramrail's guarantee.

Because of a number of outstanding design features, all Cleveland Tramrail equipment is unusually smooth operating, whether it be hand propelled, motor-driven, or completely automatic. In fact, Cleveland Tramrail equipment rolls so easily that often hand propelled equipment can be used where motor-driven is normally found necessary.



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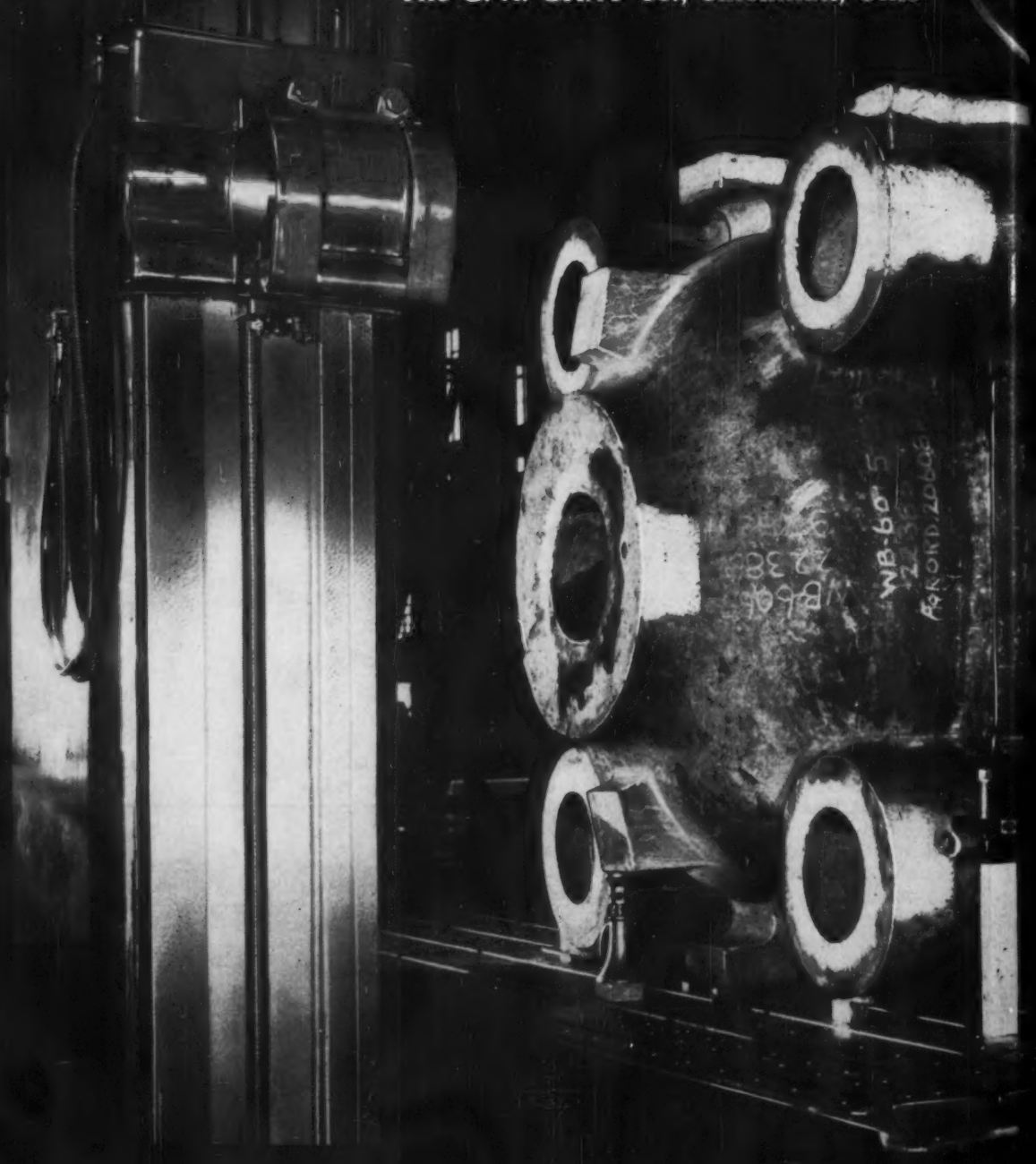

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Your product and scheduling requirements become the dictates of every Anaconda Aluminum specialist the minute your order is written. Their follow-through is what we call custom service.

Because of the extreme flexibility designed into all Anaconda Aluminum's modern production facilities, your order—large or small—is scheduled promptly, shipped on time. Every order receives the personalized attention of experienced aluminum craftsmen throughout production—added assurance that precision controls maintain your critical specifications.

In addition to the satisfaction of such custom-shop service, Anaconda Aluminum gives you all the advantages of integrated production with a full range of products—pig and ingot, coiled and flat sheet, rod, bar, structurals, tubular and other extruded shapes. For custom service on your next order, call your Anaconda Aluminum representative, or write our General Offices, Dept. A-4, Lousiville 1, Kentucky.

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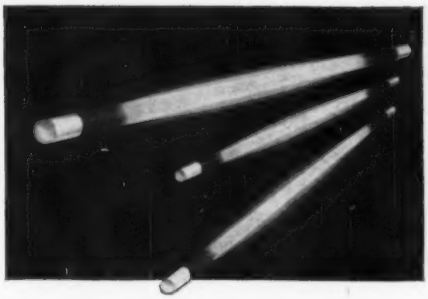
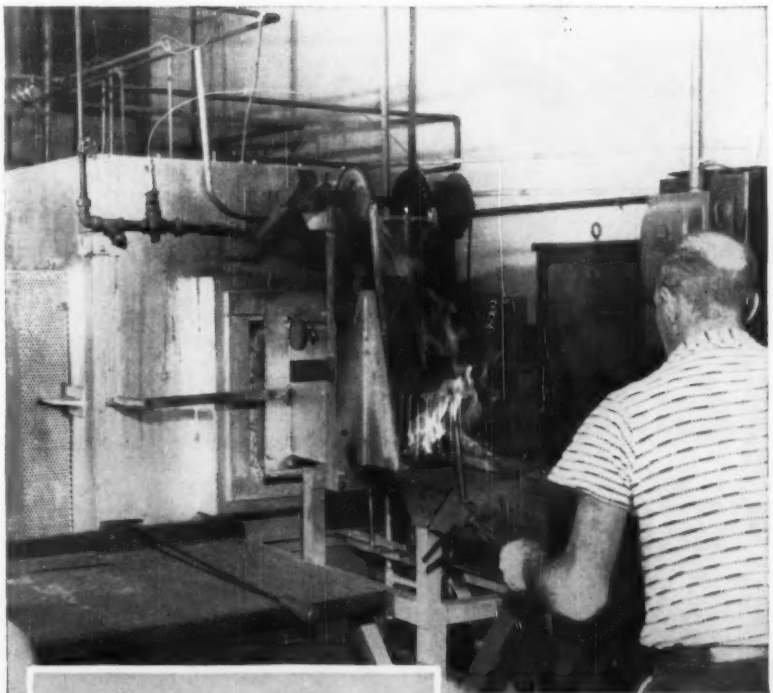


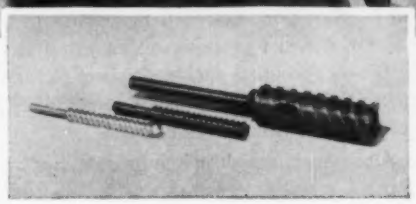
Norton CRYSTOLON Heating Elements or "HOT RODS" are a typical Norton R_x — an expertly engineered product prescription for greater efficiency and economy in electric furnace and kiln operations. These one-piece rods, made of self-bonded silicon carbide, have a central hot zone and cold ends. Aluminum-sprayed tips and metal-impregnated ends minimize resistance and power loss. Available in all standard sizes.

Leading manufacturer of masonry bits

Gets twice as much life — and more!

... from Norton "HOT RODS"





Operator at New England Carbide Tool Company, Medford, Mass. loads masonry bits into C. I. Hayes Electric Furnace which brazes carbide tips to the shanks of the bits. Norton "HOT RODS" are used exclusively in this furnace because of their longer life and constant heat control characteristics.

Continuous operation in a hydrogen atmosphere at 2250°F is a tough assignment for *any* electric furnace heating element. But Norton CRYSTOLON* Heating Elements ("Hot Rods") take it in stride at New England Carbide Tool Company, world's only manufacturer of a complete line of carbide-tipped masonry bits.

In fact, the company has proved by actual performance that Norton "HOT RODS" last more than twice as long as any other type of non-metallic heating element. What's more, they find that Norton "HOT RODS" make possible smoother, more economical control of power to the furnace during this critical brazing operation.

Norton "HOT RODS" are outlasting other heating elements of the same type in plants everywhere . . . providing better control of heat . . . protecting quality at critical stages of production . . . keeping element costs and maintenance at a new low.

Put Norton "HOT RODS" to work in your heat treating and metalworking operations. They're available in lengths from 6 inches to 8 feet to meet a wide variety of heating requirements efficiently and economically. Get complete details. Send for "Norton Heating Elements". NORTON COMPANY, Refractories Division, 203 New Bond Street, Worcester 6, Mass.

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Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — **BEHR-MANNING DIVISION** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

In providing a secure, easily interchangeable attachment for Gravely rotary cultivators, Republic Nylok Studs are inserted into the adapter shown at left. The cultivator unit is then placed in position over studs, and nuts are applied, holding cultivator firmly in place. Republic Nylok Fasteners hold securely even under shocks from hidden stones, and vibration from the severe churning action of cultivator blades.

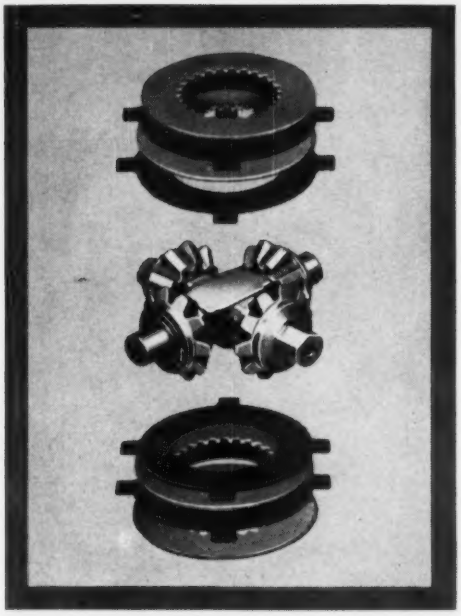
Republic Nylok® Fasteners Hold Securely Even Under Shocks of Rotary Cultivation

Finding a dependable fastening method for tractor-attached rotary cultivators presented a real challenge to Gravely Tractors, Inc., Dunbar, West Virginia. A fastener had to be found that would hold securely and give long, dependable service under the constant shocks and pounding of rotary cultivating. To meet these requirements, the company chose Republic Nylok Studs.

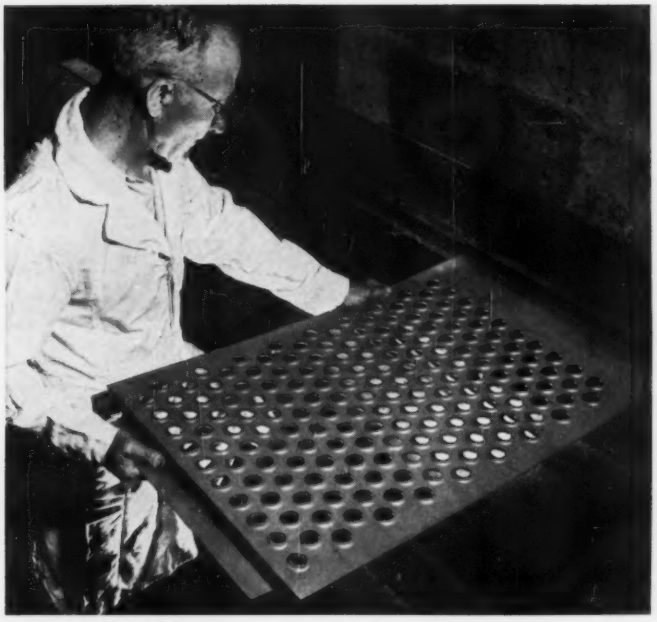
Republic Nylok Fasteners have a special nylon insert that assures positive locking at any position, even under severe shock, vibration, or tension. When the fastener is assembled, this nylon plug exerts pressure in a lateral direction, preventing all play, and utilizing the metal-to-metal contact of the opposing threads for locking.

Republic Nylok Fasteners provide maximum holding power under all conditions, whether seated or not; and they can be used repeatedly. One of their unique advantages is the "plastic memory" of the nylon plug—the tendency of the nylon to recover its original shape after assembly. This "growth" into the threads actually results in a tighter locking action, after a period of time, than when the fastener was first assembled.

The nylon insert is unaffected by age or cold, has high resistance to heat, and very low moisture-absorption rate. These are but a few of the advantages which led Gravely Tractors, Inc., to use Republic Nylok Fasteners on their advanced line of rotary cultivators. These and other advantages can pay dividends in *your* application, too. For full information, contact your Republic representative, or mail coupon.

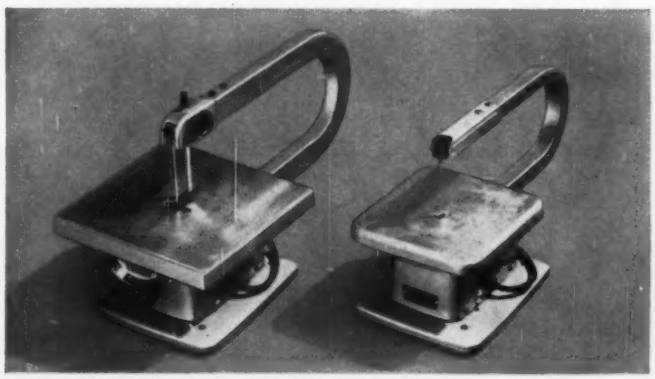


SUPER TOUGHNESS AND STRENGTH at critical points are provided by Republic Alloy Steels in the Powr-Lok Differential developed by Dana Corporation, Toledo, Ohio. Dana engineers have reduced the possibility of mechanical breakdown in clutch rings and side gears by forging these parts from Republic Hot Rolled 8615 Alloy Bars. This fine steel withstands torque, fatigue, shock, and stress, and makes possible maximum resistance to abrasion, friction, and wear. An exceptionally high strength-to-weight ratio permits the designing of thinner sections. For further facts, send coupon.



ECONOMY WITH CORROSION-RESISTANCE is provided by Republic Galvannealed Sheets, used by Air Conditioning and Drying Division, Surface Combustion Corporation, Toledo, Ohio, in making KATHABAR® Dehumidification Systems. In these units Galvannealed Sheets help solve corrosion problems. And their tight, uniform zinc coating will take all ordinary forming operations. Shear, blank, pierce, form, flange, solder, deep draw, or bead them with ease. For more information on Republic Galvannealed Sheets, mail coupon now.

SAVINGS IN TIME AND MATERIALS are realized by Syncro Corporation, Oxford, Michigan, by using Republic ELECTRUNITE® Mechanical Tubing in the manufacture of jigsaws. Previously they used a casting for the blade-yoke, which requires a severe bend. ELECTRUNITE Square Tubing was recommended for one model, rectangular tubing for the other. Results: reduction in weight of the blade-yoke, and improvement in appearance of the product, with savings in time, materials, assembly, and shipping costs. For more information on Republic ELECTRUNITE Mechanical Tubing, mail coupon below.



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Please send additional information on the following:

- ☐ Nylok Fasteners
- ☐ Galvannealed Sheets
- ☐ Republic Alloy Steels
- ☐ ELECTRUNITE Mechanical Tubing

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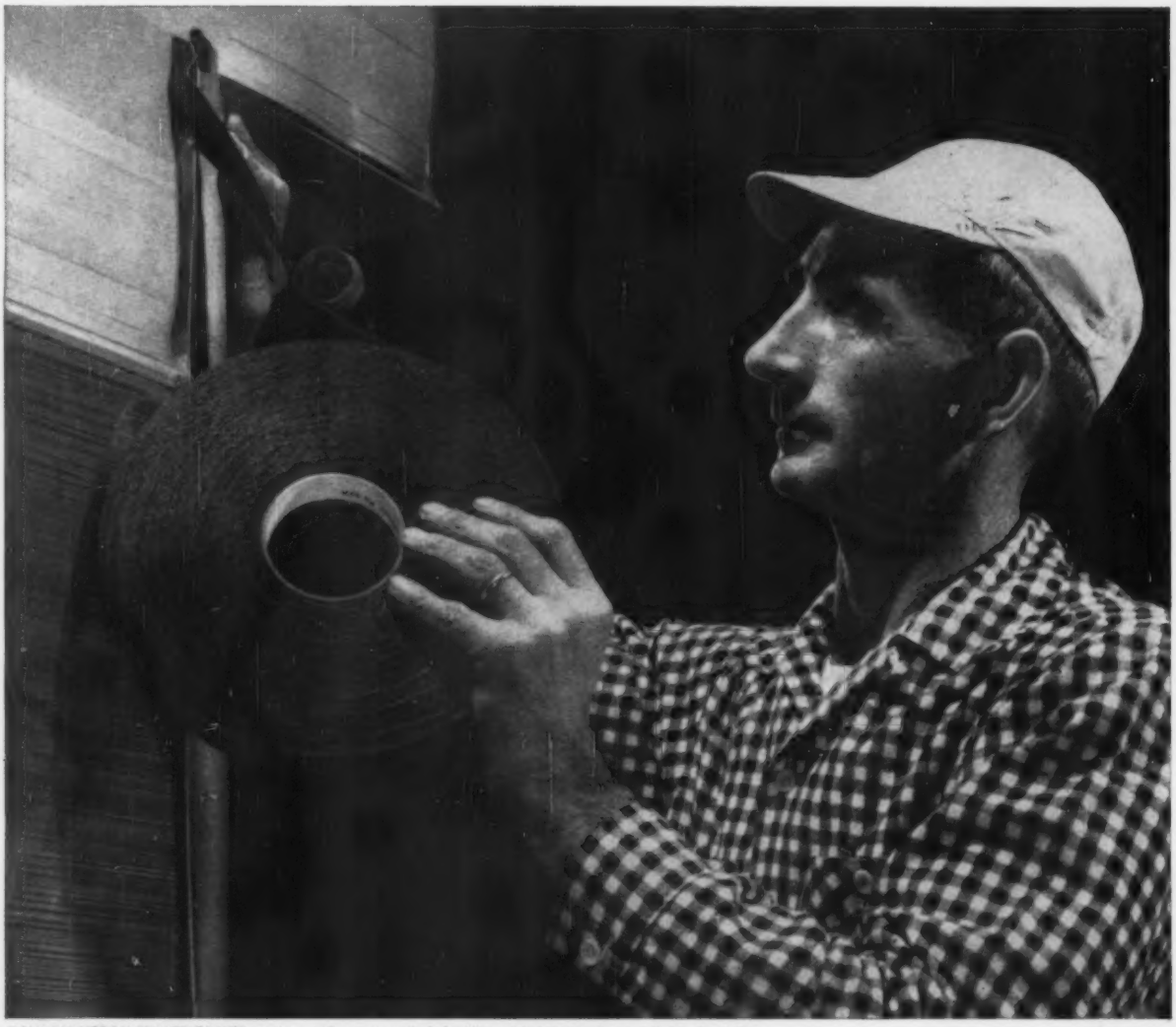
You just roll this sealer on! 3M Ribbon Sealer EC-1202



ROLL-ON RIBBON SEALER EC-1202 creates a uniform, economical, durable seal that shuts out water, dust and moisture.

It's easy to shut wind and weather out of mobile homes with 3M Sealer EC-1202. You just roll this synthetic rubber ribbon on, apply the next piece of metal . . . and fasten mechanically right through the sealer.

Because it's fabric-reinforced, EC-1202 holds its shape, doesn't stretch, sag or shrink. It applies just as easily along curved surfaces.

In mobile homes, this roll-on ribbon makes a weather-tight seal at lap seams and window beddings. And EC-1202 serves boats, curtain walls, commercial refrigeration, too. It's available in various widths and thicknesses direct from your local jobber.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU! Consult 3M Research. Contact your 3M Field Engineer. Or for information and free literature write: A.C.&S. Division, 3M, Dept. YP-49, 900 Bush Ave., St. Paul 6, Minn.

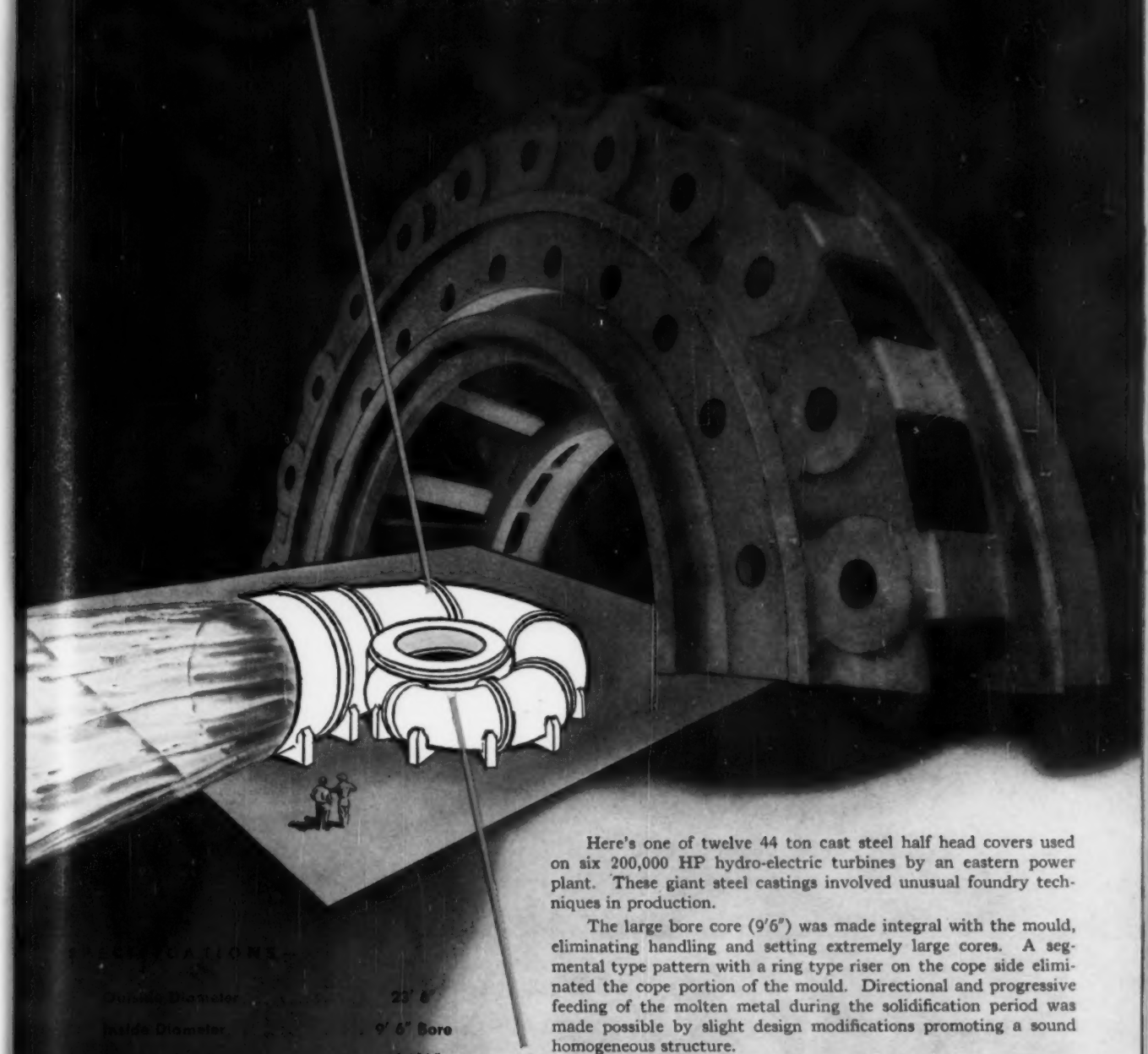
ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Cast Steel Harness for 200,000 Horses



Here's one of twelve 44 ton cast steel half head covers used on six 200,000 HP hydro-electric turbines by an eastern power plant. These giant steel castings involved unusual foundry techniques in production.

The large bore core (9'6") was made integral with the mould, eliminating handling and setting extremely large cores. A segmental type pattern with a ring type riser on the cope side eliminated the cope portion of the mould. Directional and progressive feeding of the molten metal during the solidification period was made possible by slight design modifications promoting a sound homogeneous structure.

After stripping, the castings were subjected to hydro-blasting and arc-air method for excavating surface imperfections. Finally, rigid dimensional inspection was followed by magnetic particle and radiographic examination at critical areas.

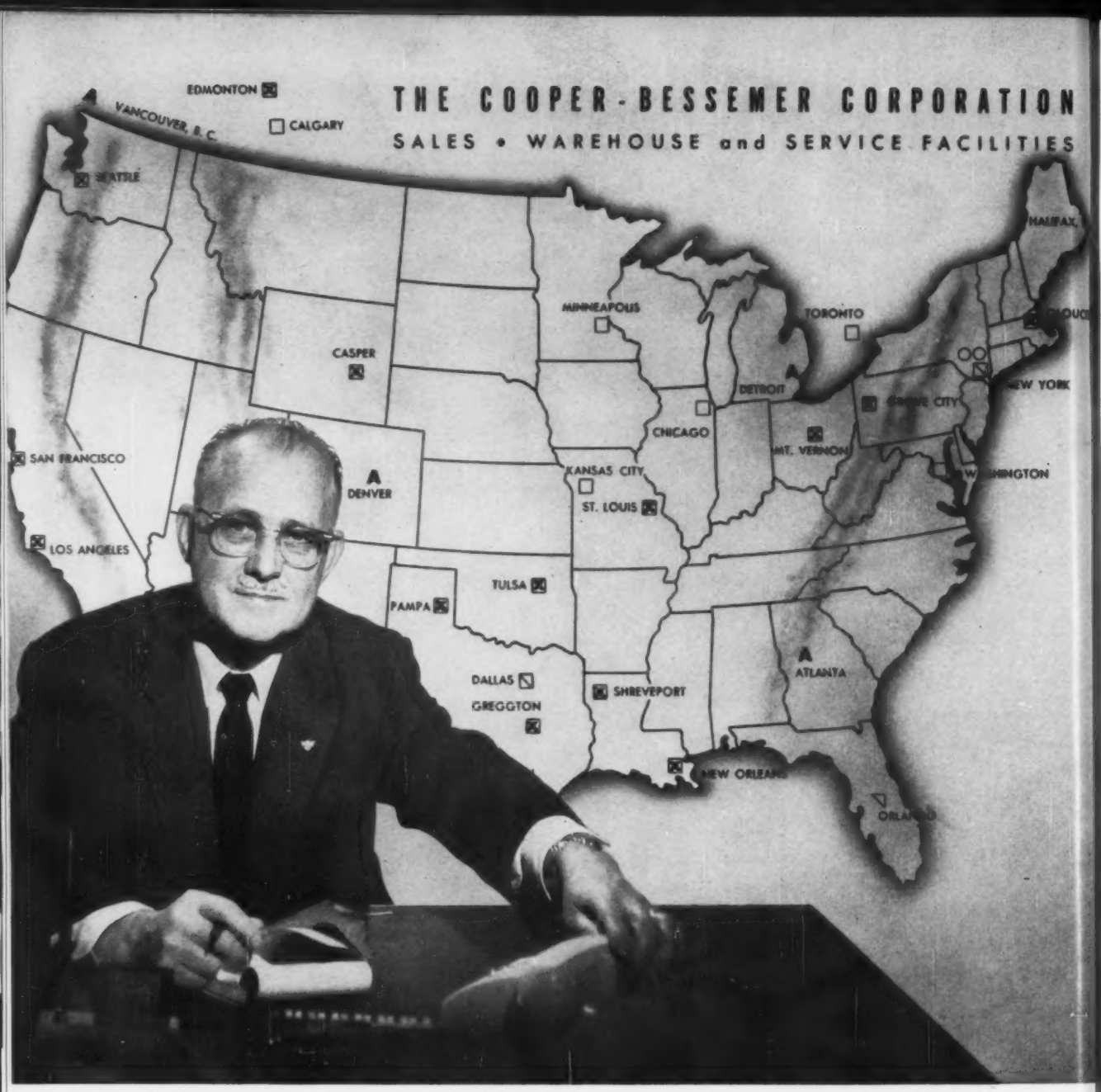
Here, at Erie Forge & Steel, experienced engineers, metallurgists and craftsmen control quality every step of the way from raw materials to finished steel casting. Consult with us on your steel casting and forging requirements.

SPECIFICATIONS

Outside Diameter	23' 8"
Inside Diameter	9' 6" Bore
Height	5' 1¼"
Wt. of (Half) Head Cover	88,510 Lbs.
Wt. of Risers and Gates	93,000 Lbs.
Total Metal to Pour	181,510 Lbs.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA



Edmund S. Budd, *Manager of Parts Division,*
The Cooper-Bessemer Corporation, points out that...

You are this near to Cooper-Bessemer service!

Cooper-Bessemer engineers are ready to assist you in planning power or compression facilities, or solving operating problems.

Experienced Cooper-Bessemer field technicians assist you in installation and servicing of equipment.

Cooper-Bessemer warehouses, strategically located, provide replacement parts for speedy servicing and peak availability of your facilities.

WHEN YOU INVEST in Cooper-Bessemer engines, compressors or controls, our service facilities are as close to you as the telephone... night and day! We serve you in these three important ways:

Technician service. Our skilled installation and maintenance crews are permanently located in areas throughout the country, ready to assist you, to assure top economy of operation and availability of your Cooper-Bessemer equipment.

Warehouse service. We maintain an extensive inventory of replacement parts for Cooper-Bessemer products in strategic locations to give prompt attention to your needs.

Engineering service. As new or changed conditions arise, our experienced field service engineers can give you on-the-spot recommendations. And they are backed up by the strong team of Cooper-Bessemer engine and compressor engineers in Mount Vernon.

The superiority of Cooper-Bessemer Service can save you thousands of dollars yearly in capital investment and in operating cost. Make sure you take this important *plus value* into account when you specify and buy engine and compressor facilities.

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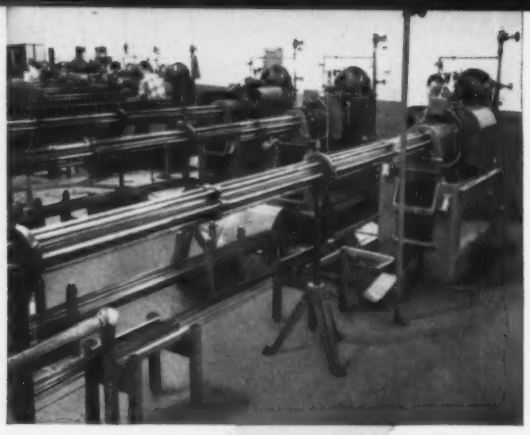
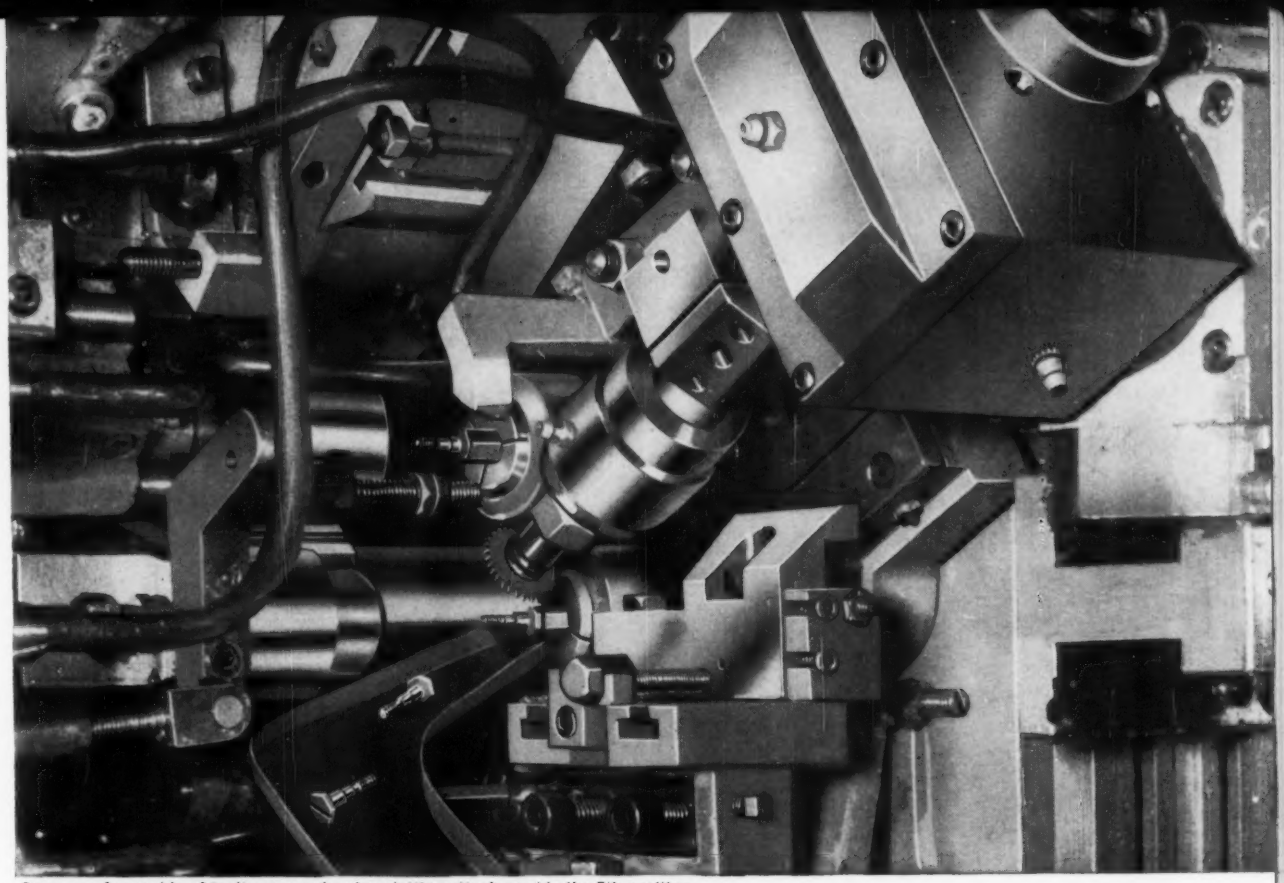
in the Run . . . or Last



An eight unit battery of ¾" RA-6 Acme-Gridleys.

Acme-Gridleys Sustain Exacting Tolerances for IBM®'s "New Look"



Close-up of rear side of tooling zone showing slotting attachment in the 5th position.

At IBM's modern Lexington, Kentucky plant, twenty Acme-Gridley 7/16" six spindle automatics are mass-producing the small to miniature parts for their sleek new electric typewriter. They help to provide IBM with greater *sustained* accuracy at lower cost than other comparable machines.

The precision components are held to closely controlled tolerances of .0005 t.i.r. These limits apply to the last piece in the run as well as the first, and consistent accuracy is maintained with less machine adjustment than ever before realized. Sustaining the closely controlled tolerances of these parts completely minimizes costly rejections during exhaustive quality control checks of the completed units. Inspection time is greatly reduced.

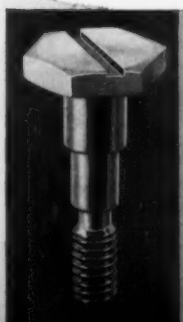
IBM has also found that the wide-open tooling zone of their 7/16" Acme-Gridleys permits much greater latitude in tooling up for complicated operations performed in a single set-up. This, plus the lasting accuracy of direct camming and the flexibility of independently operated toolslides, makes this newest member of the Acme-Gridley family a profitable asset to IBM's modern production line. Write for Bulletin MRA-58.

Pioneer in Circumferential Automation

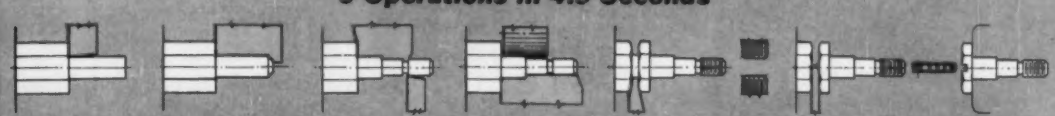
National Acme

The National Acme Company
175 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.



9 Operations in 4.9 Seconds



6. Rough Turn Front End
1. Rough Form and Chamfer Front End
2. Finish Form Two Diameters Finish Turn Thread Diameter
3. Shave Three Diameters
4. Breakdown for Cutoff-Thread
5. Cutoff-Pickup and Slot

Atlas Steels' *26" 2-high reversing blooming mill*

speeds production under the **BIRDSBORO** *trademark*

And that trademark has come to mean quite a lot to steel producers in the U.S., Canada, Europe and other points on the globe. The strength and ruggedness demanded by the steel industry are blended with the advanced thinking and modern design ideas of the BIRDSBORO engineers. The result is productive and profitable mill machinery with a long, useful service life. The BIRDSBORO representative in your area can cite specifics. You'll find them very interesting. *Sales Department, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

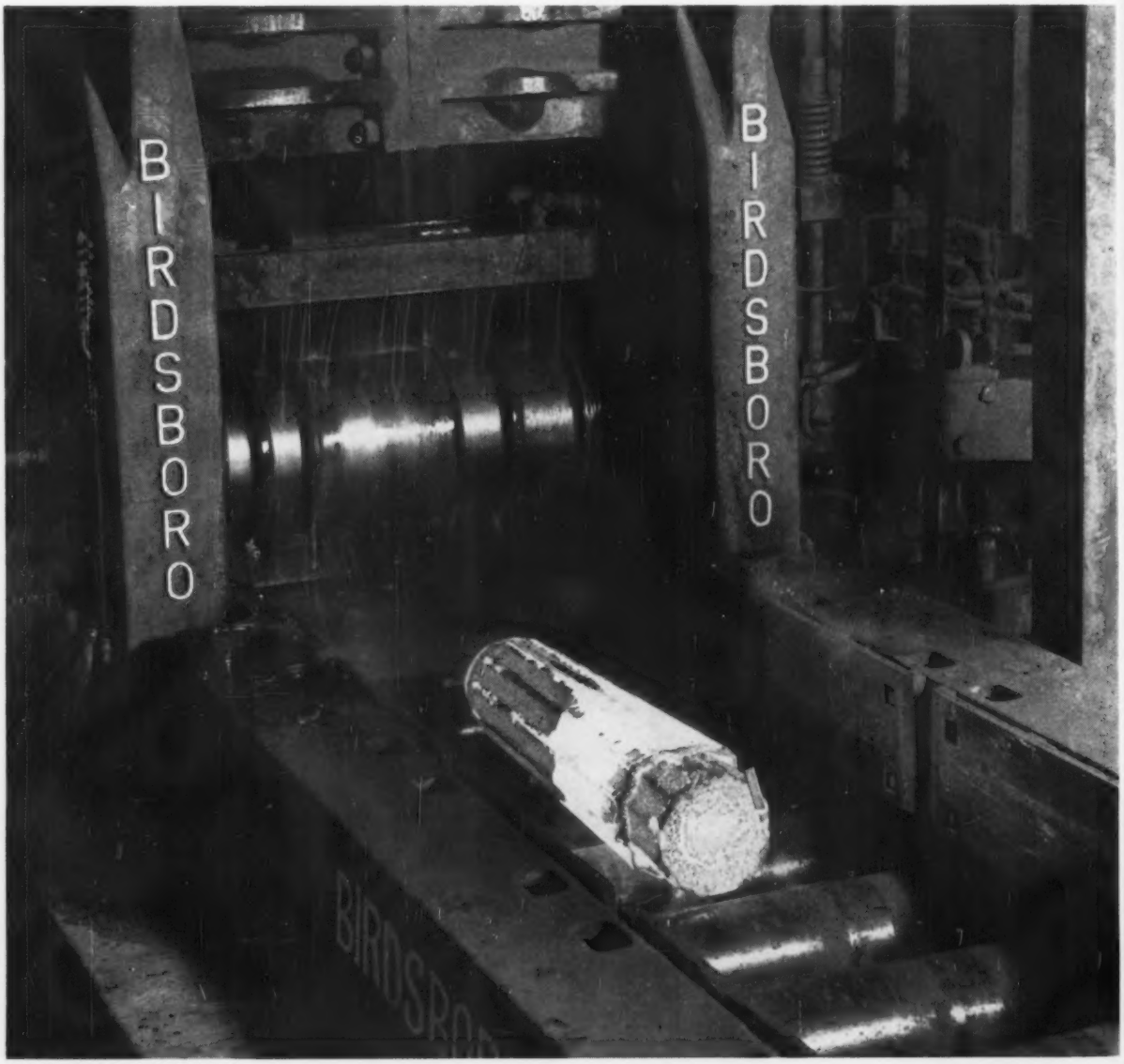


Photo Courtesy Atlas Steels Limited

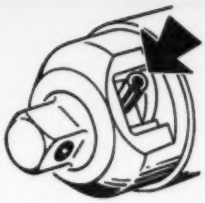
MM-74-59

BIRDSBORO

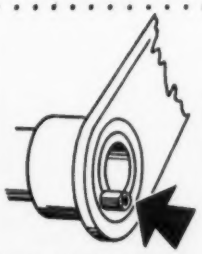
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Rollpin® replaces 12 different fasteners

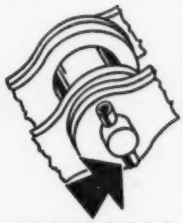


REPLACING A GROOVED PIN . . . in this application, Rollpin serves as a step pin in a ratchet wrench adaptor. With its light weight and high shear strength, Rollpin functions perfectly . . . cuts assembly costs.



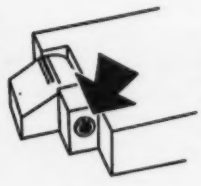
REPLACING A KEY . . . Rollpin demonstrates its ability to do away with precision tolerances, in this heating system damper arm. Faster, cheaper and more satisfactory than previous assemblies.

REPLACING A RIVET SHAFT . . . Rollpin serves as an axle for the sparkwheel of a cigarette lighter. No riveting or threading necessary . . . faster assembly. Note flush, clean fit.

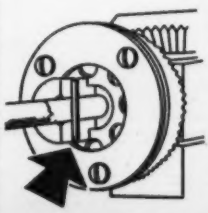


REPLACING A COTTER PIN . . . Rollpin assembly time is shorter, service life ten times longer. Vibration-proof flush fit. Easily removable.

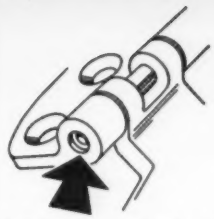
REPLACING A SET SCREW . . . to fasten automobile brake handle a short length Rollpin is self-retained in the hand grip but can easily be driven into over-drilled hole in shaft for simple handle removal.



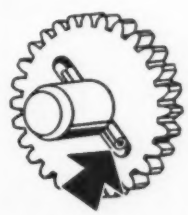
REPLACING A CLEVIS PIN . . . here Rollpin holds firmly in clevis, permits free action of moving member. Rollpin application shown is the plate of a home workshop tool.



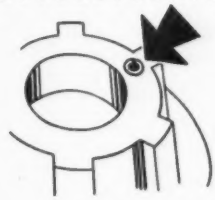
REPLACING TAPER PINS . . . in the assembly of precision differentials eliminated cost of taper pin reamers and the entire reaming operation. Rollpin costs less than a taper pin and installation is cheaper. They remove easily.



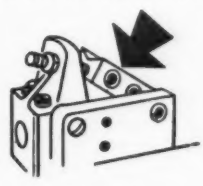
REPLACING A HEADED PIN . . . in this hinge pin application, Rollpin is simply and inexpensively driven in place, greatly reducing assembly costs. Constant spring tension holds Rollpin firmly in place . . . eliminates loosening of hinge due to wear.



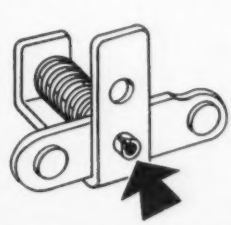
REPLACING A HUB ON A GEAR . . . Rollpin, self-retained in shaft, is simply snapped into molded slot to position sintered gear. This application, by an office equipment manufacturer, effects major savings in assembly. Rollpin's high shear strength is particularly valuable here.



REPLACING A DOWEL PIN . . . Rollpin is used here to prevent rotation of a thrust bearing. No reaming, no special locking. Easily removed. Lowest possible dowel pin cost.

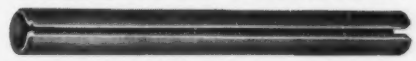


REPLACING A BOLT AND NUT . . . Rollpins act as fasteners and pivots for the linkages in this electric welder. Rollpins may be used with a free fit in outer or inner members depending upon product design requirements.



REPLACING A RIVET . . . Rollpin serves as guide shaft for spring-loaded electrical interlock contacts. This electrical equipment manufacturer reports that rivet failure previously occurred at the clinched end under normal operating impact and vibration.

WHERE CAN YOU USE THIS SIMPLE FASTENER?



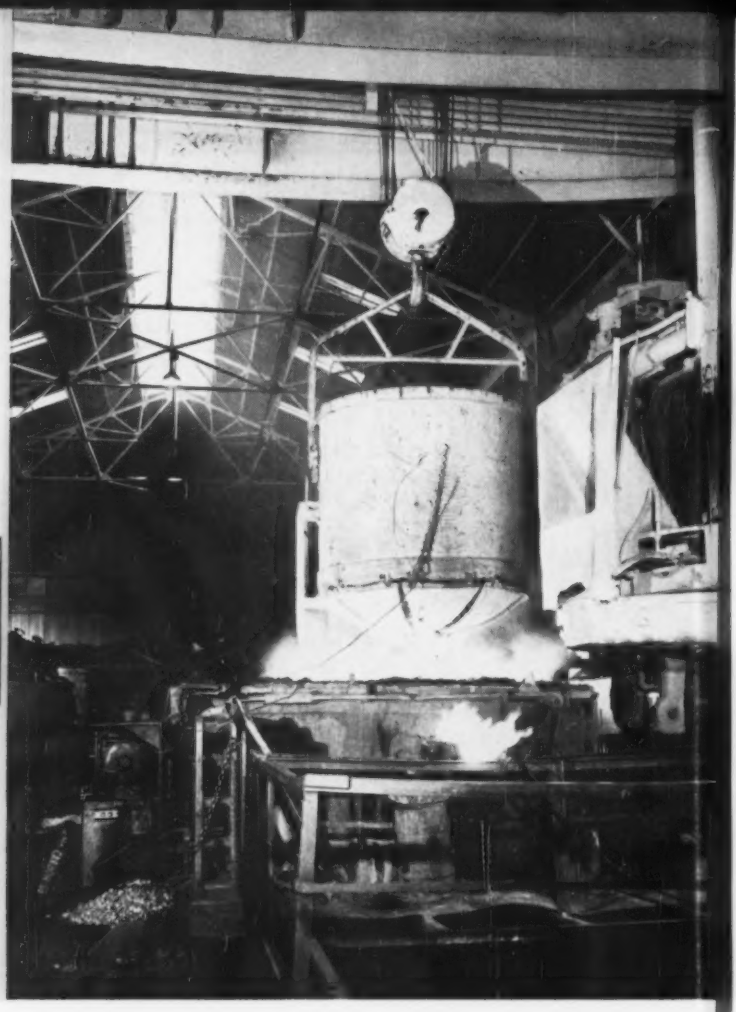
Rollpin is the slotted tubular steel pin with chamfered ends that is cutting production and maintenance costs in every class of industry.

Drives easily into standard holes, compressing as driven. Spring action locks it in place—regardless of impact loading, stress reversals or severe vibration. Rollpin is readily removable and can be re-used in the same hole. Made in carbon steel, stainless steel and beryllium copper. Write for samples and information, ELASTIC STOP NUT CORPORATION OF AMERICA, 2330 Vauxhall Road, Dept. R47-477, Union, New Jersey.

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 VAUXHALL ROAD, UNION, NEW JERSEY

ROLLPIN TRADEMARK



Three times longer rope life

at Northwest Steel Rolling Mills, Inc., Seattle, Wash.

Yellow Strand Flattened Strand Wire Rope provided the answer to increasing rope life at Northwest! They had tried ordinary round strand rope, then another brand of flattened strand—and finally Yellow Strand in their charging crane and big yard crane.

Now they've standardized on Yellow Strand Flattened Strand. Why? For example, one ⅝" Yellow Strand line on the charging crane carrying 6-ton loads now runs for 5 months, where ordinary rope once served a little over a month and a half. *This is 3 times the life!*

What accounts for the difference? Take a second look at the Yellow Strand Flattened Strand cross-section. Note that load weight and wear are distributed over many wires instead of a few, giving 12 points of contact with the sheave groove. Because of its design, Yellow Strand Flattened Strand has a 10% greater metallic area, a marked increase in strength plus a compactness and crush-resistance unobtainable in ordinary round strand rope.

Thus Yellow Strand Flattened Strand makes possible longer rope service life, less downtime, greater profits. It can do the same for you! See your Yellow Strand Wire Rope Distributor *today* for an analysis of your wire rope requirements. Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand®

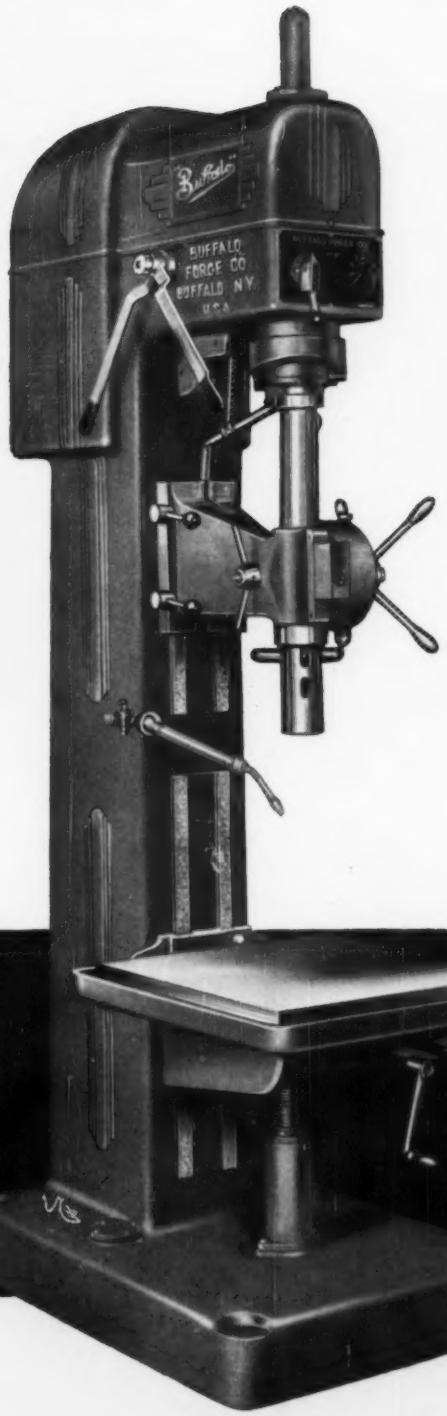
WIRE ROPE

SLINGS

CLIPS

NEW

"Buffalo" No. 3A R-P-Mster with 2" Capacity and Torque-controlled Feed!

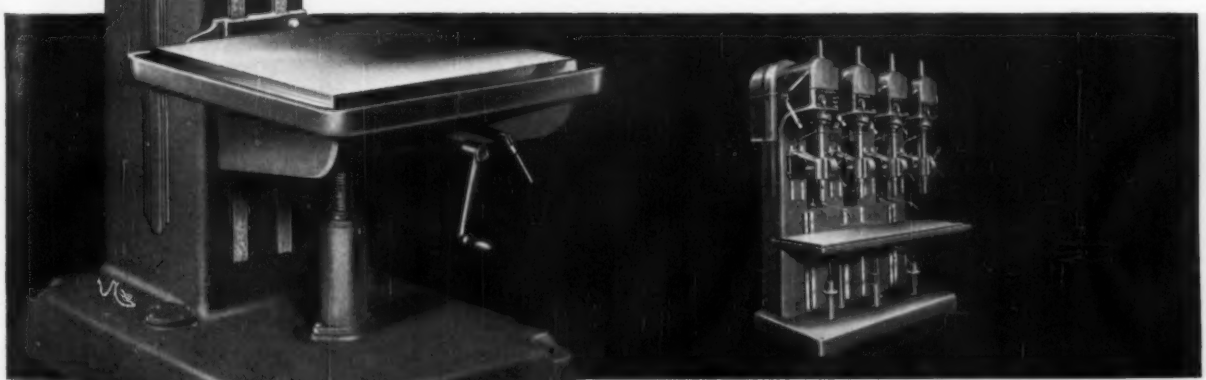


Welcome news for metalworking men! The new "Buffalo" No. 3A R-P-Mster brings you a rated capacity of 2" in mild steel.

Equally important is the exclusive "Buffalo" Torque-controlled Power Feed. With it you can safely use maximum speed and feed for the size hole being drilled. No need to worry about damage to drill or machine gearing. Danger of overloading the machine is positively eliminated by the torque control on the feed shaft.

Moderate price makes the new "Buffalo" No. 3A R-P-Mster your best variable speed drilling machine buy. All the other famous R-P-Mster features are retained — "1001" speeds, easily and quickly changed — extreme accuracy, smoothness, quietness and ease of drilling — rugged construction for long life with a minimum of maintenance. Available in 1 to 6 spindle models.

Only when you operate it yourself will you really appreciate these advantages of the "Buffalo" No. 3A R-P-Mster. Discover today how it can cut your drilling costs, increase production. Phone your "Buffalo" machine tool dealer for a demonstration, or write direct for Bulletin 3257-C.



Above: Multiple Spindle Pedestal Model
Left: Pedestal Model

BUFFALO FORGE COMPANY
492 BROADWAY BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

DRILLING • PUNCHING • SHEARING • BENDING

ANOTHER IN A SERIES
OF MOTOR FACTS
FROM ALL INDUSTRIES

"Roughest duty we have ever seen motors endure"

reports Marquette Iron Mining Co. of the Westinghouse Life-Line A motors in its Eagle Mills Pelletizing Plant

Operating continuously, 24 hours per day, dependable Westinghouse Life-Line® "A" motors drive a network of fans and conveyors at the Eagle Mills Pelletizing Plant of Marquette Iron Mining Co., Ishpeming, Michigan.

Some of these motors are located directly above a sintering machine where ambient temperatures often exceed 200° F and the motor is subjected to deposits of finely divided iron ore. Under these conditions, not a single motor breakdown or failure has occurred during 11 months of service.

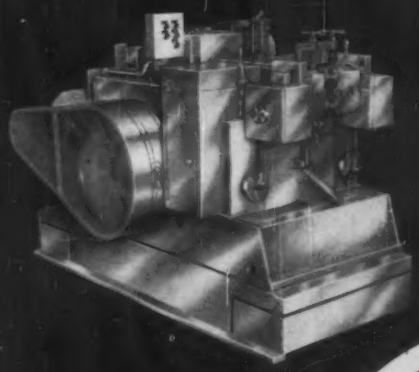
Says Mr. Ed Gagnon, plant electrician, "Our Westinghouse motors have given us complete reliability on the roughest tests we have ever seen a motor endure."

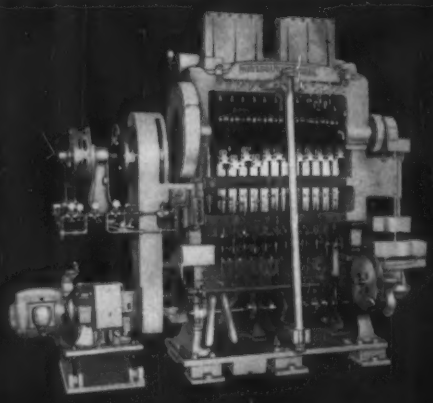
For specific information about the ways your operation can benefit from the improved performance, longer life and reduced maintenance offered by the dependable Life-Line "A," contact your nearby Westinghouse sales engineer. Or write to Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22077

YOU CAN BE SURE...IF IT'S Westinghouse

Deposits of powdered iron ore are no problem to this 2-hp Life-Line "A" motor driving conveyor which carries powdered iron ore to the balling disc where ½" pellets are formed. Presealed, prelubricated Life-Line "A" bearings keep dirt and other material out.

COLD HEADING
MACHINERY

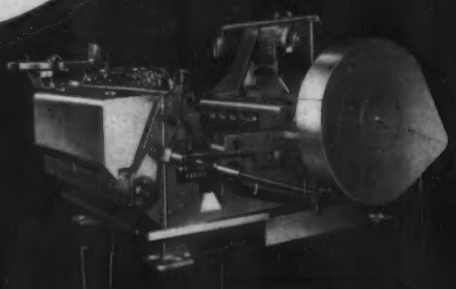




EYELET, SLITTER
& WIRE
MACHINERY

WATERBURY
MACHINERY BUILDERS
FARREL

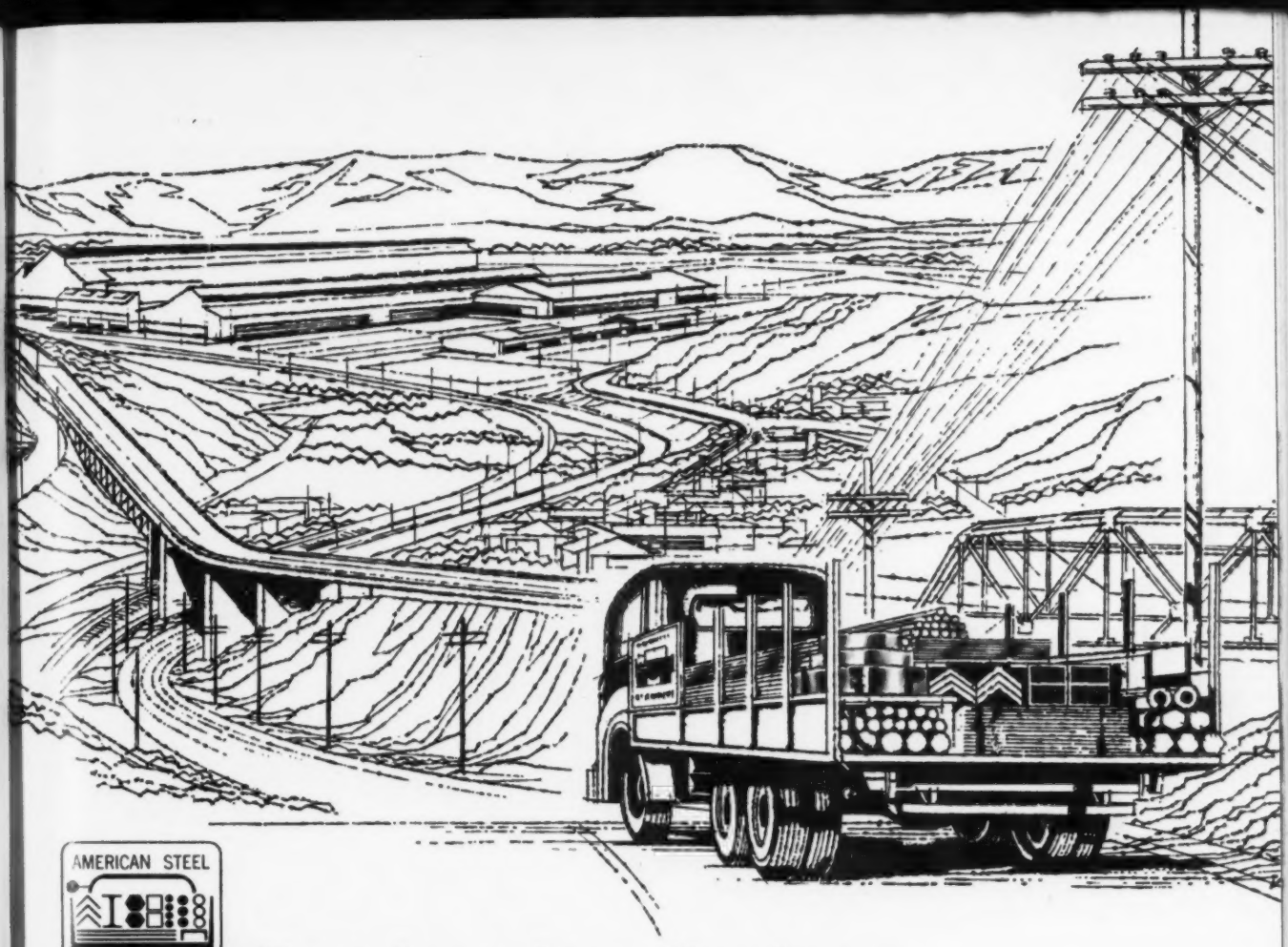
ROLLING MILL
MACHINERY



POWER
PRESSES

THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut • U.S.A.
Sales Offices, Chicago • Cleveland • Los Angeles • Millburn, N. J.

WF-57



AMERICAN STEEL WAREHOUSE ASS'N.

Symbol for Savings

In back of this symbol is a unified campaign to make every steel service center more efficient and more productive, for you. Today's **Modern** Steel Service Center enables you to:

REDUCE CAPITAL EXPENDITURES

You can operate with realistic inventories, freeing capital for more profitable purposes.

REDUCE OPERATING COSTS

Stacking, sorting, storing, cutting—every operation on a piece of steel adds to operating costs. Modern Steel Service Centers eliminate many pre-production services, and do the needed ones economically because their equipment and specialized manpower are used full time.

REDUCE OVERHEAD COSTS

Obsolescence, taxes, insurance, accounting, rent, heat, light—all overhead items which are too easily forgotten although they add to production costs. Modern Steel Service Centers eliminate these costs to you.

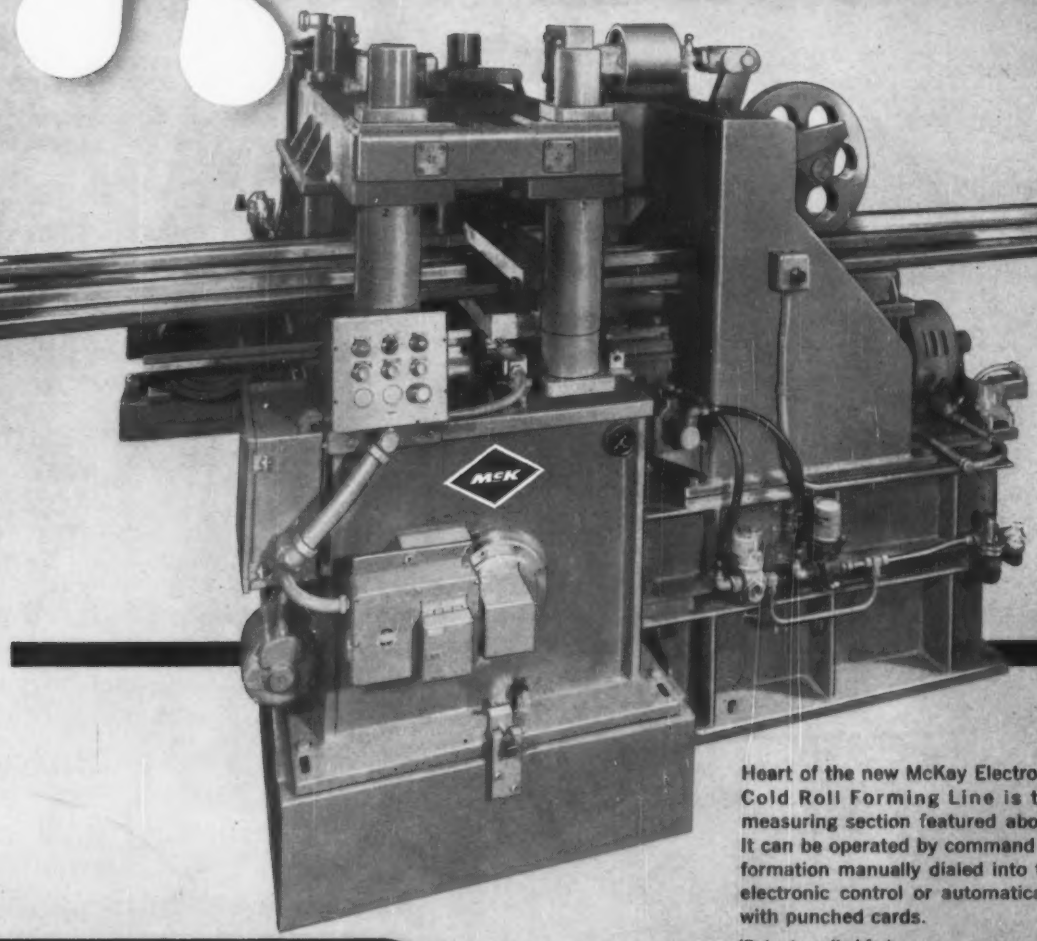
Using a Modern Steel Service Center is Like Adding a Money-Making Department to Your Plant

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

J&L STAINLESS
SHEET • STRIP • BAR • WIRE

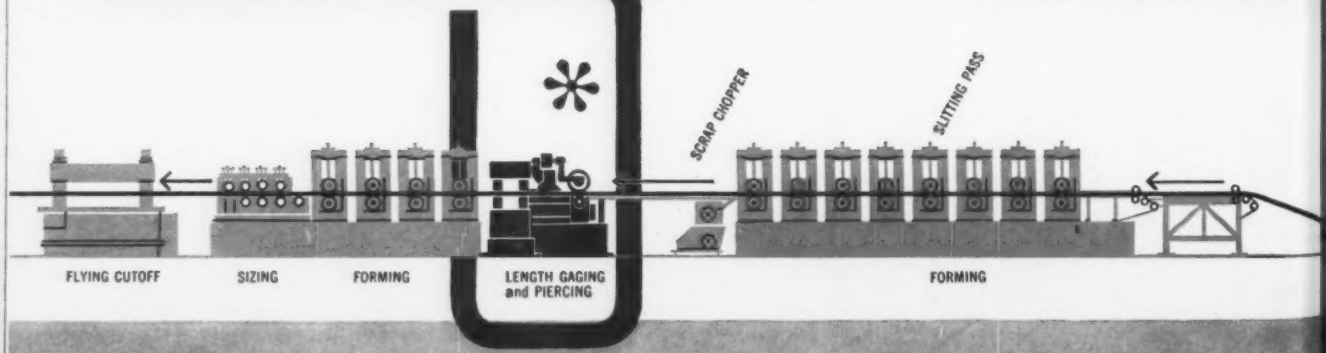
Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

10,001 d



Heart of the new McKay Electronic Cold Roll Forming Line is the measuring section featured above. It can be operated by command information manually dialed into the electronic control or automatically with punched cards.

(Patent applied for)



The line illustrated above was recently purchased by a large building products manufacturer for high speed production of roof and floor deck.

different lengths...

...WITHOUT A MANUAL ADJUSTMENT

McKAY'S ELECTRONIC LENGTH GAGE has a memory permitting instantaneous changes in cut lengths and scheduled quantities as well as precise control of notch and punch spacing on each length.

A transistorized electronic control reads and stores information from punched cards and utilizes an electronic counter to trigger a punching and notching press at precise intervals as commanded by the coded data on the punched cards.

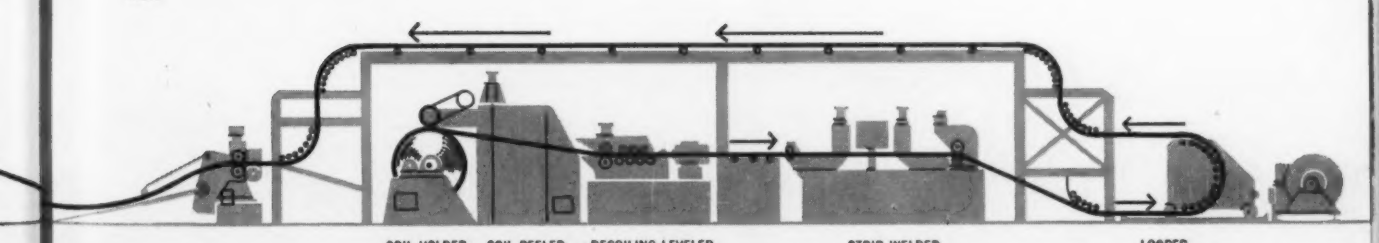
Now! the planning department can schedule the output of a forming or cut-up line without waiting to group identical lengths.

Now! down time previously required for manual length gage adjustment is converted to productive time.

Now! in addition to length control, precise spacing of notches and punches can be controlled and changed by commands received from coded information on the standard data processing card.

BE SURE TO GET THE FULL STORY ON McKAY'S ELECTRONIC GAGE FOR YOUR PRODUCTION LINES.

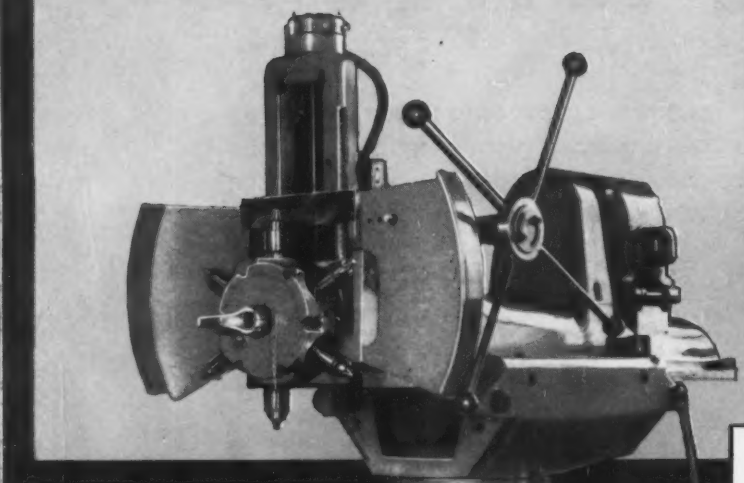
Call or write the McKay Machine Company, Youngstown 10, Ohio.



McKAY MCK MACHINE

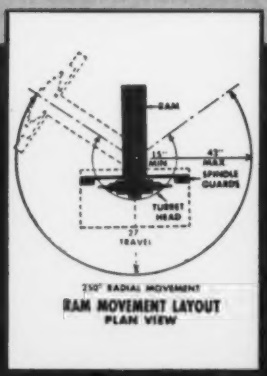
300% Increase in Drilling Productio Pa

BURGMASTER 6-SPINDLE RA



The use of six Burgmaster 6-spindle radial drills for machini of TERRIER MISSILE components has increased drilli reaming, tapping and counterboring of complex parts in t Convair-Pomona operated facility by approximately 300 as compared to 4 or 6 spindle table drills. This substanti increase has been determined from an analysis of sixteen ind vidual parts. These savings will result in the amortization the equipment in 2.04 years.

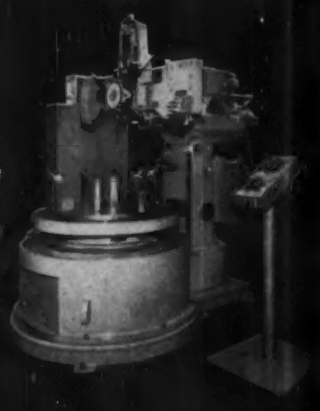
The radial turret drilling machines have simplified the m tiple drilling operations by fast precision indexing of multiple tooled turrets. Tool settings and cutting sequences consistently and accurately repeated at maximum speed realize substantial savings in operation time. On the hydrau manifold alone a total of 96 operations is performed using different tools. Dimensional consistency and closer toleranc are achieved by the complete mechanization of the machini sequence.



RAM MOVEMENT LAYOUT
PLAN VIEW

250° Radial Movement. The radi drill sweeps a radius of 14" minimu to 42" maximum through 25 over a 24" deep x 36" long tabl The ram rolls on large doub row ball bearings and is eas controlled by one hand fro the handle on the turret. A press the thumb releases the air hydrau clamping of the ram and cradl permitting free and easy moveme of the ram in any directio Releasing the button clamps all uni rigidly in place, after which th spindle can be advanced to perfor a precision operatio

Special Automatic Hydraulic Radial Turret Drills can be built up from Standard Components and supplied as complete production units including Tools, Fixtures, and Hydraulic power. The machine automatically carries out a complete cycle of operations including approach and return of each tool, and indexing on any desired set of circular or radial centers. The flexible machine has adjustable stops and controls which permits fast set-ups for machining a variety of parts.



Specialists in High Production Turret Drilling

"0" Manual Power Index ¼" Capacity

1C Manual Power Index ⅜" Capacity

2B Manual Power Index ¾" Capacity

2BF Flange Mounted Power Index ¾" Capacity

2BH Automatic Hydraulic ¾" Capacity

3BH Automatic Hydraulic 1½" Capacity

2BR Ram Type Radial Drill ¾" Capacity

2BHT-3BHT Au Tape Contro ¾" and 1½" C

Pays for Equipment in 2.04 Years with
RADIAL TURRET DRILLS

Simplicity and Ease of Operation

The simplicity and ease with which the Burgmaster Radial Drill can be moved from one center to another, together with the 6-spindle automatic indexing turret which carries out a pre-planned sequence of operations, accounts for the savings. The turret is counterbalanced by an adjustable coil spring to make the turret weightless or for self returning to the top of stroke position. The machines have preselected spindle speeds varying from 125 RPM to 3000 RPM which permits operation at the most efficient speed for accuracy, finish, production and longest tool life. Accuracy is further assured by air hydraulic clamping of the ram slide and cradle, automatic turret clamping, and rigid micrometer depth control.

The advantages of this new method of machining Terrier Missile Manifolds can be further visualized when listing the various operations required, as follows:

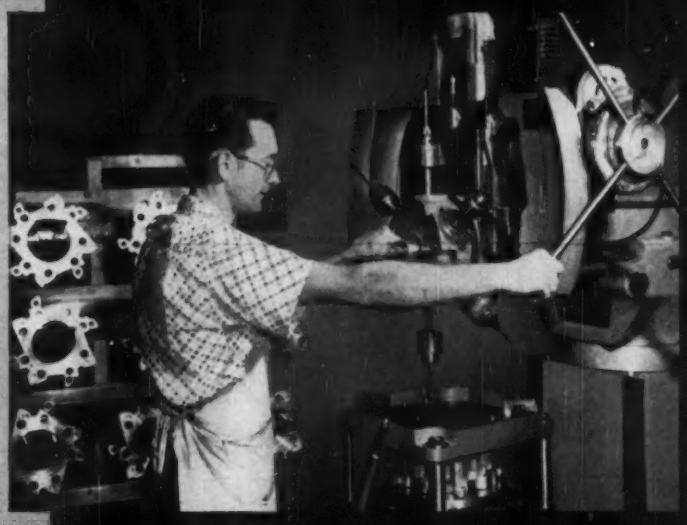
No. of Operations	Operations	No. of Operations	Operations
24	Drill .2190/.2113 dia. x .61/.58 deep.	4	Drill .152/.145 dia. x .72 deep (max.).
24	C'Sink 100° x .270 dia. Tap ¼-28 UNF-2B x .38 deep, min. perf. thds.		C'Sink 100° x .208 dia. Tap 10-24 NC—2B x .430 deep, min. perf. thds.
8	Drill .196/.204 dia. x 1.015 max. depth. C'Sink 100° x .271 dia. Tap ¼-20 UNC-2B x .65 deep, min. perf. thds.	2	Drill .348/.342 dia. thru.
1	Drill .241/.246 dia. x .580 deep. Ream .252/.248 dia. x .540 deep.	1	Drill .348/.338 dia. thru at 75° angle.
8	Chamfer 45° x .030 deep.	2	Drill .114/.102 dia. x .91 deep (max.). C'Sink 100° x .168 dia. Tap 6-32 NC—2B x .35 deep, min. perf. thds.
4	Drill .381/.374 dia. x 1.38 deep at 15° angle.	3	Drill .206/.196 dia. x .61 deep. (max.). C'Sink 100° x .273 dia. Tap ¼-20 NC—2B x .38 deep, min. perf, thds.
4	Drill .381/.374 dia. at 30° angle to break thru. (56 deep ref.)	4	Drill .208/.198 dia. x .80 deep C'Sink 100° x .30 dia. Tap ¼-20 NC—2B x .50 deep, min. porf. thds.
3	Drill .152/.145 dia. x .600 deep. (max.).	4	Drill .2037/.2008 dia. thru. C'Sink 100° x .78 dia. Tap ¾-20 UNEF—2B thru.

Total Operations 96
Total Different Tools.....10

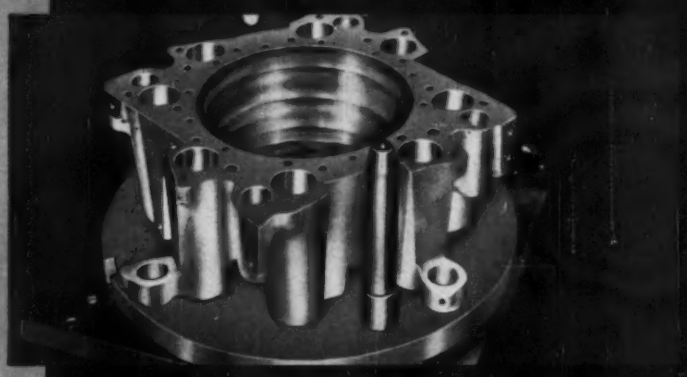
JOB FACTS

Machine	Six Burgmaster 6-Spindle Radial Turret Drills
Part	Hydraulic Manifold
Material	Aluminum
Total Operations	96
No. of Different Tools	10
Lot Sizes	1 - 20
Number of Types	1
Accuracy	±.002 to ±.005 and .004 True Position
Fixture	Special Fixtures with Drill Bushings
Former Method	4 and 6 Spindle Table Drills
Former Time	1½ Hours
Present Time	½ Hour

PRODUCTION INCREASED BY 3 TIMES



One of the SIX Burgmaster Radial Turret Drills used for Drilling, Countersinking, Tapping, Drill-Heli-Coil Tapping, and Reaming Operations on Terrier Missile Hydraulic Manifolds at Convair (Pomona), a Division of General Dynamics Corporation.



The completed Terrier Missile Hydraulic Manifold showing some of the 96 operations which utilize ten different tools to produce.

Write for bulletin describing Burgmaster 6-Spindle Radial Drills in detail; also 20-minute 16MM sound film showing Burgmaster Turret Drills in operation, including the new Automatic Tape Controlled Machine, available from any office.

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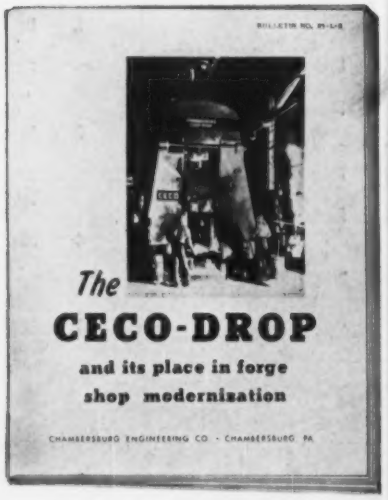
To convince yourself, you should read Chambersburg's 28-page bulletin on Forge Shop Modernization.

Send for your copy today.



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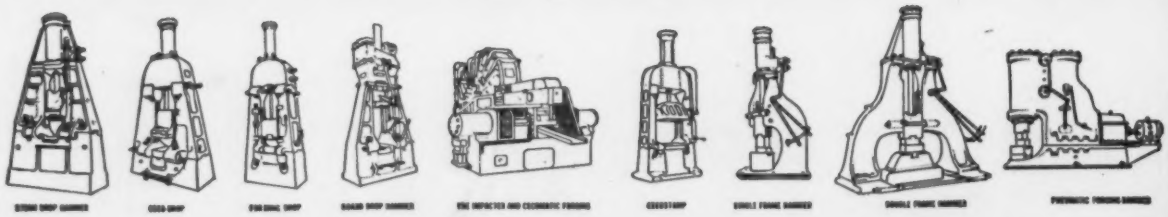

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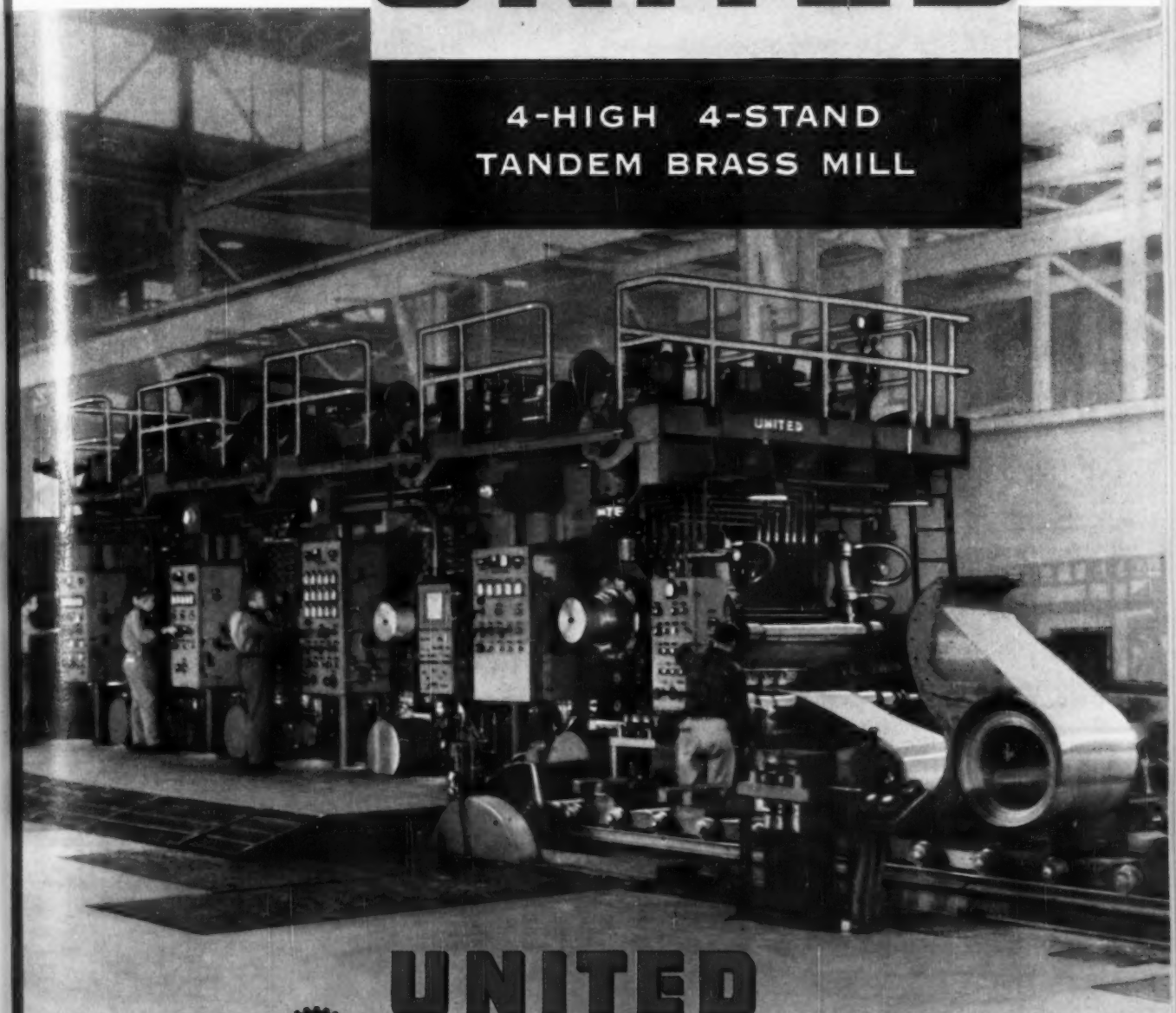

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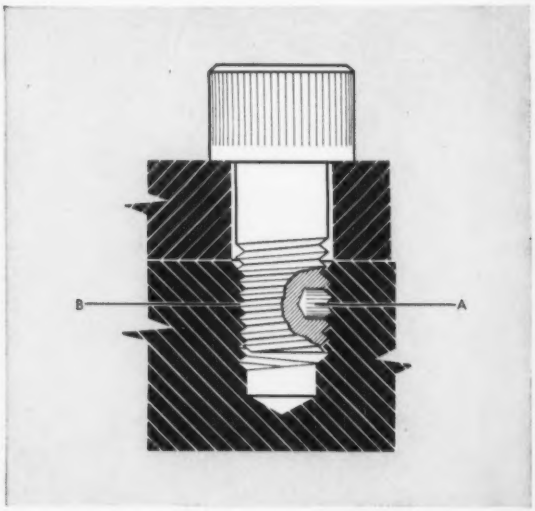
Why UNBRAKO socket screws with Nylok* won't work loose

Self-locking UNBRAKO socket screws, in a full range of standard types and sizes, are stocked by your authorized SPS distributor. Permanently installed locking pellets are serviceable from −70 to +250°F and will not dry out, rot or shrink, are not affected by age or fungus.



How Nylok locks: Resilient nylon pellet (A) sets up lateral thrust, smoothly wedging mating threads together (B). Locking action is entirely on threads and is positive, seated or unseated: UNBRAKOs with Nylok are easy to remove and are reusable.

Regular screws loosen under vibration because external stresses cause marked variations in screw tension, resulting in motion between mating threads and loss of frictional holding power.

UNBRAKO socket screws with Nylok stay put, because they do not depend on screw tension to keep them tight. Here is how they work: A tough, resilient nylon pellet, inserted permanently in the threaded section of the screw, is the locking medium. Before assembly, the locking pellet projects slightly beyond the crest of the thread. When mating threads are engaged, it is compressed. Its springlike wedging action grips threads tightly and sets up a counterthrust, creating a strong metal-to-metal engagement of the mating threads. Locking is positive whether the screw is seated or not. And the permanently installed nylon locking pellet retains strength characteristics from −70 to +250°F.

In addition to their remarkable resistance to loosening under the most severe operating conditions, UNBRAKO self-locking socket screws save production time. They eliminate the need for lockwashers under the heads of screws, drilling of heads for lockwires, cotter pins, and complex multiple set screw installations. And they can be used repeatedly without losing their locking ability.

See your authorized SPS industrial distributor for complete details. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

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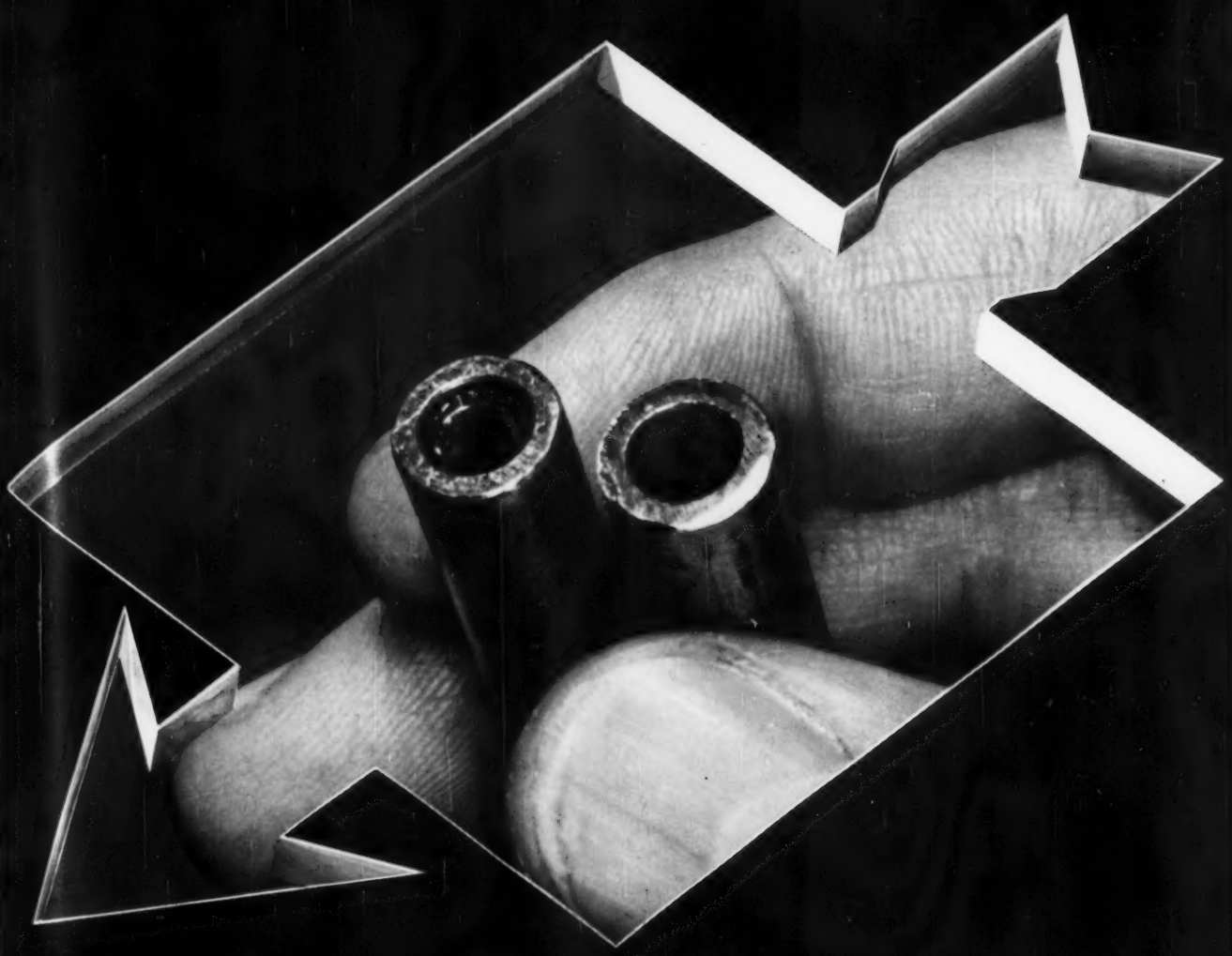

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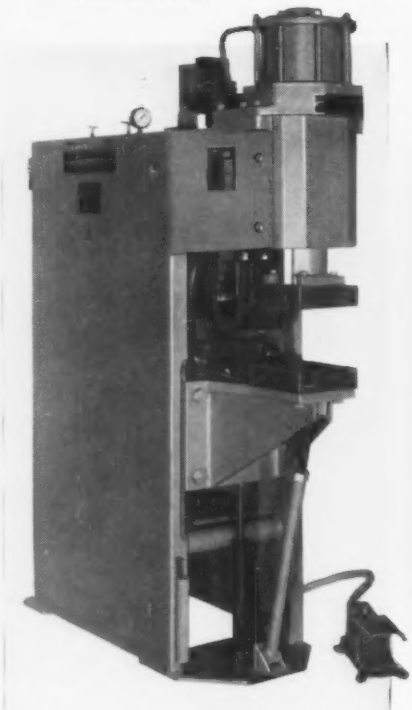
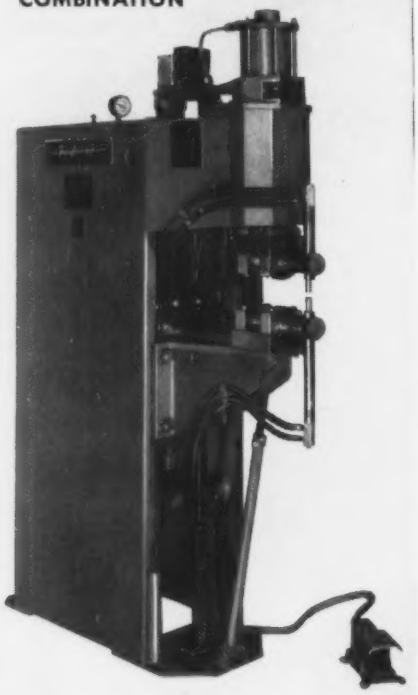


SPOT

COMBINATION



Available from stock in four sizes in capacities of 30 to 500 K.V.A.

Completely new . . . these advanced design trim-line press welders will give you maximum production in a minimum floor area. What's more their compact, simplified design assures easier operation, less maintenance and ready accessibility.

Designed and built by Federal, one of the largest and most experienced resistance welder manufacturers, these new welders are available from stock as spot welders with horns, projection welders with platens, or combination spot and projection welders. Each type is available in a full range of standard throat depths, welding forces and transformer sizes.

Many standard automatic welding attachments are available to increase production with these standard machines.

Listed below are some of the features. For more information get in touch with the Federal representative nearest you. Ask for Bulletin P-59 and Special Tooling Bulletin AWA-59.

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- **New One Piece Frame** . . . stronger, less floor area, greater accessibility.
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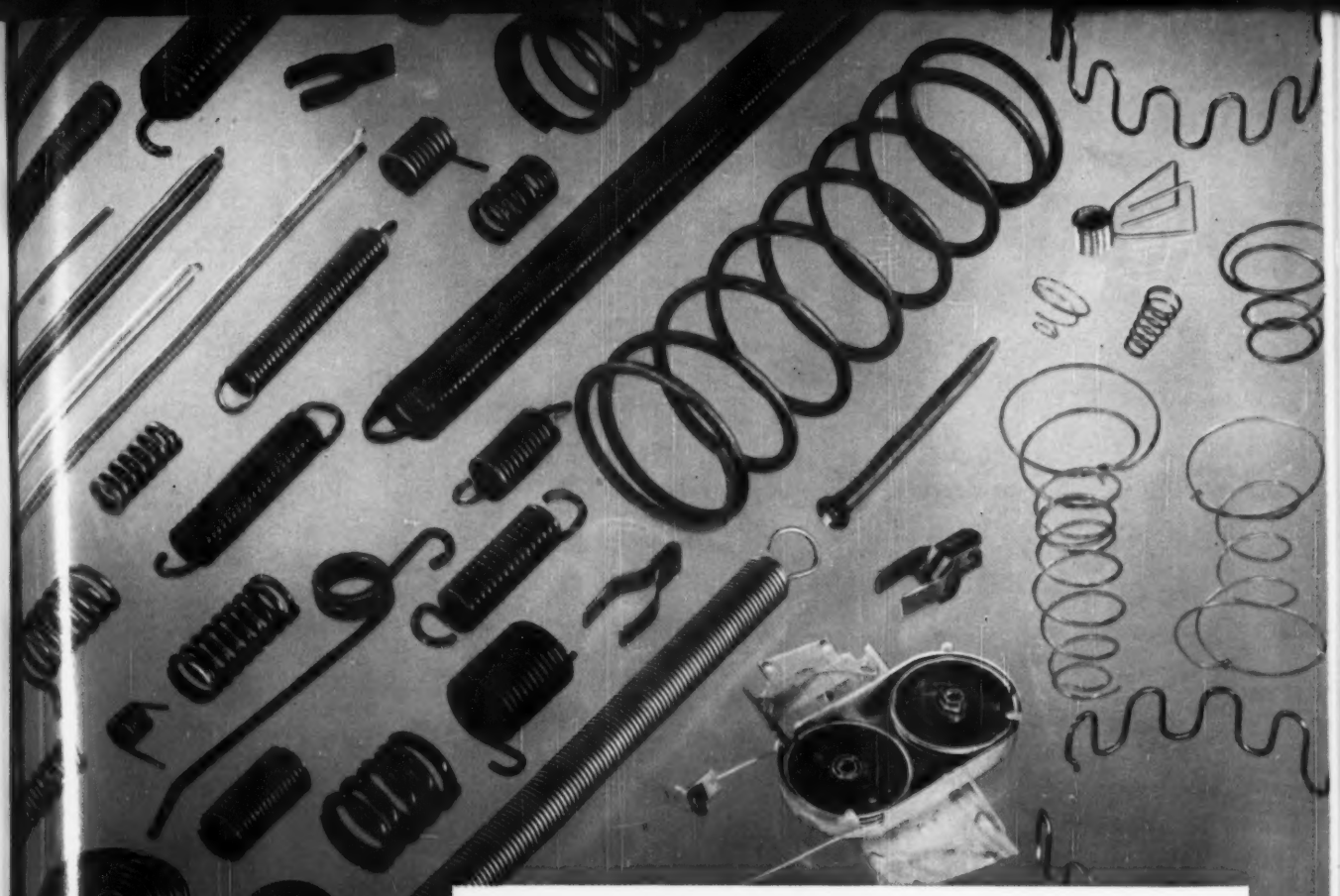

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The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common . . . their superior quality. This, of course, is related to the inherent fineness of the materials.

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Whatever the type, size or characteristics you require—Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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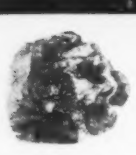

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new tests prove...THE SMOOTHER SURFACE OF CONTOUR-WELDED* STAINLESS TUBING *provides* LONGER FATIGUE LIFE!

Recent tests prove that surface smoothness in tubing is vital to long fatigue life. And these same tests prove that TRENTWELD® tubing —made by the exclusive *Contour-Weld* process—is smoother than full-finished seamless and any other welded tubing.

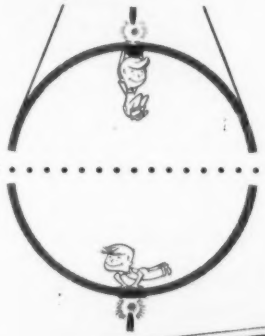
It's smoother than seamless because its walls are formed from uniformly rolled strip steel—whereas seamless is extruded from a billet.

It's smoother than other welded tubing because *Contour-Welding*, Trent's patented process, virtually eliminates the weld bead inside the tubing.

This extra surface smoothness substantially improves *fatigue life*, essential in hydraulic and pressure applications. It also improves *corrosion resistance*, vital for chemical applications. And it helps eliminate *particle incrustation*, thereby preventing product contamination.

TRENTWELD tubing is readily available in sizes ranging from ⅛" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircaloy and Hastelloy†. For details, send for the free 48-page "Trent Tubing Manual." Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In CONVENTIONAL WELDING of tubes, gravity pulls molten metal down inside the tubing to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

* **With CONTOUR-WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

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stainless and high alloy pipe and tubing

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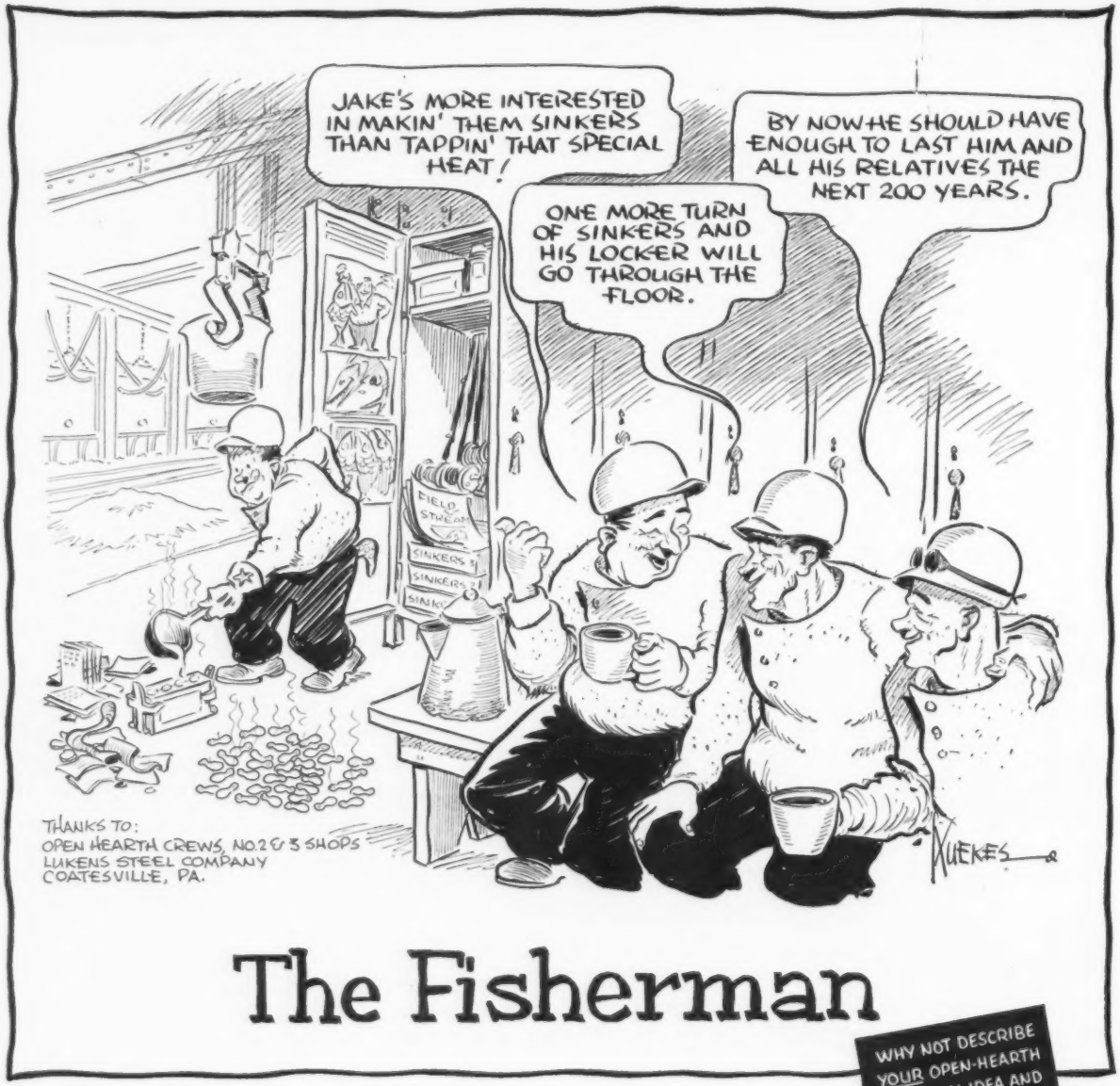
THE OTHER TURN


JAKE'S MORE INTERESTED IN MAKIN' THEM SINKERS THAN TAPPIN' THAT SPECIAL HEAT!
ONE MORE TURN OF SINKERS AND HIS LOCKER WILL GO THROUGH THE FLOOR.
BY NOW HE SHOULD HAVE ENOUGH TO LAST HIM AND ALL HIS RELATIVES THE NEXT 200 YEARS.
FIELD & STREAM
SINKERS
SINKERS
SINKERS
THANKS TO:
OPEN HEARTH CREWS, NO. 2 & 3 SHOPS
LUKENS STEEL COMPANY
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KUEKES

The Fisherman

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

STEEL SERVICE CENTERS are ready to support their customers through a 60-day steel strike, if necessary. Warehouse stocks by July 1, possible strike deadline, will be close to 5.7 million tons. That's about a million tons above the level at start of the '56 steel strike. The warehouses hope to have balanced inventories. But some market areas would feel the supply pinch before others.

IF THERE IS NO STEEL STRIKE, mill operations in the third quarter will drop to 60-70 pct of capacity. That's the consensus of top steel men. Current operating rate is about 94 pct of capacity. After the summer lull, business would pick up again in the fourth quarter.

ALUMINUM COMPANY OF AMERICA will become a more aggressive factor in the aluminum end-product market. So says I. W. Wilson, Alcoa's board chairman. Mr. Wilson feels the time is past that his company should stick so exclusively to basic and semi-finished aluminum products.

RESIDENTIAL USERS OF ELECTRICITY may be selling power to power companies one of these days. This word comes from Dr. Lawrence J. Giacoletto, manager of Ford Motor Co.'s electronics department. He says solar energy cells installed in private homes may produce more electricity than the home owner uses. He would thus be in a position to sell the excess.

GOOD PACKAGING can be both a sales tool and a money-saver. This was brought out at a recent meeting on the subject in Chicago. A Westinghouse engineer cited a case where better packaging of electric motors is saving the company $50,000 a year.

MATERIAL HANDLING EQUIPMENT MAKERS are feeling the effect of the business upsurge. The Material Handling Institute reports February bookings were nearly nine points better than the dollar volume in January. It marked the second straight month of better business in this industry.

NEW CAR SALES are in line with market forecasts. On the basis of latest reports, 1959 sales will hit 5.5 million cars. This makes allowance for seasonal ups and downs.

GRAY IRON FOUNDRIES are devoting more time to cost-cutting and increasing efficiency. The founders are turning to industrial engineering and new methods to combat competitive materials.

A Natural

on Greenlee Air-Feed Automatics

Feed Out Stock to 16½"

Eliminate Pushers and Feed-Out Cams

Greenlee Air-Feed Automatics offer you a 3-way profit advantage:

1. Maintenance and change-over time is reduced by eliminating stock pushers, feed tubes and feed-out cams.
2. Stock can be automatically air-fed to position in one or more machining stations permitting two or more pieces per cycle.
3. Multiple feed-out flexibility enables you to finish machine a variety of pieces that ordinarily demand costly second operation setups.

If you are running into production headaches on a specific job, Greenlee may be able to adapt an "Air-Feed" to solve your problem. See your Greenlee Distributor.

Write for your copy of Catalog A-405 — first step on the way to more profitable production with Greenlee Automatic Bar Machines.

Removable fittings attach air lines to the stock reel tubes. A vacuum pump withdraws the piston when restocking. Push-button control panel is provided for starting and stopping.

• • •

Greenlee Standard and Special Machine Tools

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Transfer-Type Processing Machines

Six and Four-Spindle Automatic Bar Machines

Hydro-Borer Precision Boring Machines

Die Casting Machines

GREENLEE BROS. & CO.

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Warehouses Build Inventories Against a Steel Strike

IRON AGE survey shows service centers prepared to support customers for 60 days or more if steel strike comes.

While inventories are fairly well balanced, some areas would feel pinch before others.

▪ How prepared are the nation's steel service centers to see their customers through a steel strike? How long would it take for critical shortages to develop in their stocks?

To find out the IRON AGE surveyed leading steel service centers on their inventory position. Here is how the situation shapes up, about nine weeks before a possible strike deadline:

1. By July 1, warehouse stocks will be 3.6 to 3.7 million tons, according to the American Steel Warehouse Assn. This would put distributor inventories about 1 million tons above the level at the start of the 1956 steel strike.

"Within these limits," says Robert G. Welch, executive vice president of the association, "there will be wide variations of types and products. Some of our service centers will have eight months supply of one product while others may be all but cleaned out. Service centers had hoped to increase already heavy inventories by about 10 pct before mid-year, but not everybody will be able to."

2. Warehouses believe they can support their regular customers through a 60-day strike. Beyond that point shortages would show up, depending on the products involved and the location of the distributor.

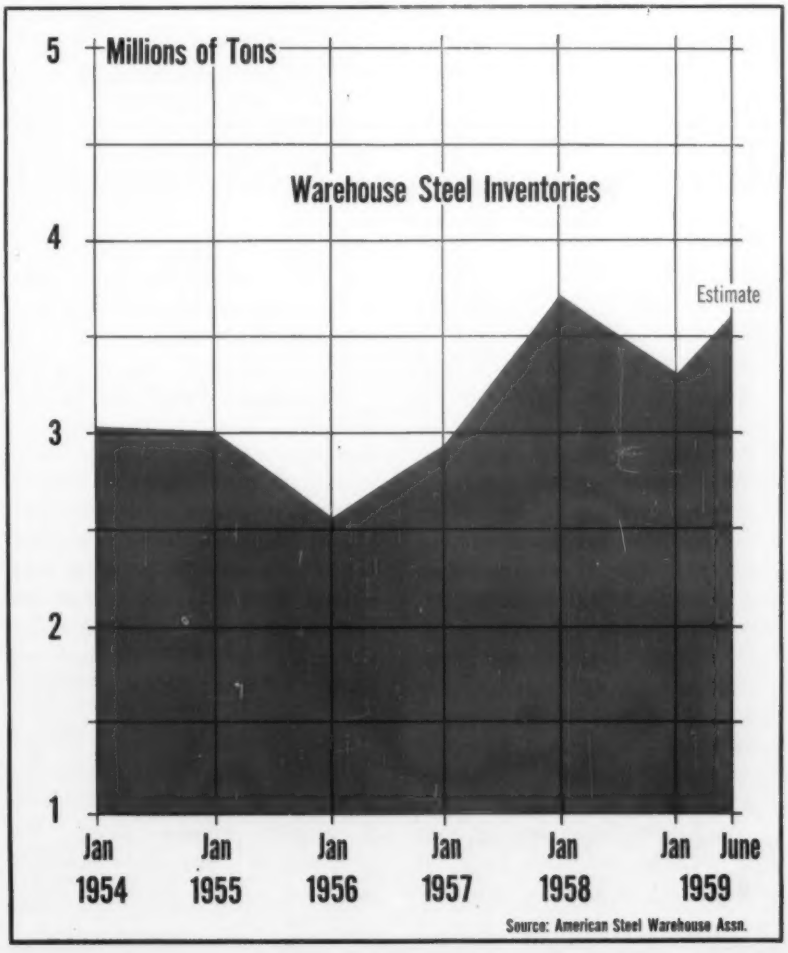
The pinch would probably come soonest and tightest in the Chicago area where improved warehouse sales have prevented any real build-up. With exceptions, service centers at Detroit, Cleveland, and Pittsburgh are aiming at 60 to 90 day stocks.

But there, also, a stronger sales level has voided efforts to fatten inventories in some cases.

Perhaps best off is the East Coast where business has been less brisk. Distributors there have taken full advantage of the opportunity to get set for a strike.

On the West Coast, service centers have been deliberately trimming down stocks because of inventory tax periods. And warehouse sales managers there say customers are doing little inventory

Stocks Are on the Rise



buying—at least so far.

3. Definite attempts have been made to better balance inventories, but there are still some "soft spots." Products on which supply shortages would develop quickest include cold-rolled and galvanized sheet, terne plate, tubing, wide plates, and some grades of pipe.

Unlike 1956, there's been a better mill supply of heavy steel products available. So distributors have "buttered up" inventories to include more of these items. Even at Chicago, structural stocks range from 90 days to six months.

4. Warehouses, in general, are still trying to enlarge stocks, aiming at a 10 to 20 pct increase by the end of June. But with better business, especially since March, steel is often going out the back door as fast as it comes in the front.

Another problem: Mill delivery delays. "We'll probably be short of our goal by the strike deadline," says a Detroit area distributor, "that's because mills have already set back some of our orders. Cold-rolled and galvanized sheet deliveries are less than we would like."

Some warehouses, a minority, have not stocked up either because they lack the money or because they feel it's unnecessary. Here's the philosophy of one Midwest distributor: "We will have only a 30-day inventory by June 30. Our thinking is that if there's a strike nobody will be able to get any steel anyway. But if we build up stocks and there shouldn't be a strike, then we'd be left with a lot of steel on hand."

5. Few regular warehouses are carrying imported steel—as yet. Reasons: Foreign mills have little left to sell for second and third quarter delivery. Also, brokers have boosted prices on foreign-made steel too high to interest distributors right now.

The foreign steel being bought is mainly galvanized sheets, wire, reinforcing bars, and structurals.

6. Warehouses, especially in the Midwest, are already alloting sheet and plate to their customers. In the event of a prolonged strike they would use systems of informal allocation. An Eastern outlet specializing in stainless has a 120-day supply of sheet and strip.

"But after three months," says the manager, "a number of items would be in short supply and we would be forced to allocate."

7. Another factor which could bring headaches to some warehouse customers: About 30 pct of the service centers would also be strike-bound. A few of these outlets, perhaps about 15, would be affected immediately. Because of staggered contracts, others would continue to close down through July and August.

How They Stand—Here's a rundown on the service center outlook by districts:

Chicago—Probably the most critical area in terms of warehouse sup-

How Warehouses Feel About Inventories

"We're going to be in pretty good shape by June 30. Back in January we started anticipating both strike and non-strike situations. We will be covered to the extent of the needs of our warehouse customers. But we won't be able to take care of mill customers. Generally speaking we expect to have enough steel on hand for about 45 days. About a year ago our inventories were 20 pct better than they presently are. But then a good part of the stock was made up of slow moving items. Now we've stocked up on the more popular items: channels, angles, sheets, galvanized." — Jones & Laughlin Warehouse Div., Detroit.

"We haven't found any big rush here because customers have all been warned of a strike. We only get a flurry of business for 4 or 5 weeks anyway during a strike and then it peters out for other reasons." —Cleveland warehouse.

"Inventory rebuilding for us started in January. However, our present stocks are still lower than normal. Still we expect to go into July with stocks about 30 pct greater than we have now—that would be around 20 pct more than normal. Barring excessive runs on certain sizes, we could then go about six weeks."—Whitehead and Kales Co., River Rouge, Michigan.

"Our inventories are 20 pct above a year ago. We believe we could help our customers for 4 to 5 months without strain. We specialize in construction accounts and have a year's supply of structurals, and six months worth of plate."—Philadelphia service center.

"In terms of present business, we have a 60 to 90 day supply of most products. Allowing for an increase in sales during the summer months, we will have on hand 30 to 40 days supply by July 1."—Levinson Steel Co., Pittsburgh.

"Our current inventory is about 8000 to 10,000 tons. We expect to increase this around 10 pct by the end of June. This would give us an additional 10 to 15 day supply. However, warehouses could be cleaned out of popular sizes in a hurry if there's a strike—it happened in 1956. This year we're carrying more items but less tonnage in each than we were a year ago.—Michigan warehouse.

plies. It's unlikely distributors there will be able to build stocks during this quarter. Smaller service centers, in particular, are already fighting shrinking sheet inventories.

Overall, hot-rolled sheet supplies are fairly strong, but stocks of cold-rolled sheet and galvanized sheet are low. Bar inventories range upward from 75 days. But there are glaring gaps in the bar supply picture.

Detroit — Distributors are trying to increase present inventories by 10-20 pct, but are running into some delivery delays from mills. In addition, business has been improving since February.

Efforts are being made to better balance supplies, but cold-rolled and galvanized sheets are already tight.

Cleveland — Most warehouses have had heavy inventories for 6 months or more. Even so they are increasing them moderately. "We normally carry about 60 days inventory," comments one official. "But we will have it up to 75 days by the end of June." Another outlet expects to have 8-10 weeks extra supply by that date.

Pittsburgh — Warehouse tonnage is much greater than it was at this time in 1958. But business has improved—in some cases as much as 25 pct. So it's a question how long inventories would last. In general, sheet supplies are listed at 60-90 days; structurals and plate, 60-90 days; and bar, 60 days.

Philadelphia—Inventories are in good to excellent shape. "It's difficult going out in the warehouse these days," says a sales manager. "There's no room to turn around." Best estimate on size of stocks: A 90 to 120 day average based on present sales.

New York — Distributors have about 60 days supply on hand, want that much in inventory by May 1. This applies to almost all products except specialties like alloy bars and tubing, aircraft tubing, and alloy forging billets.

Alcoa's Outlook

More Cost-Price Squeeze Ahead

▪ "The competitive situation in the entire aluminum industry throughout the world, as well as in this country, has been and is, tough," insisted I. W. Wilson, Aluminum Co. of America board chairman.

And the record bears him out.

In the first quarter 1959, Alcoa sales were up $8 million over the first quarter 1958. But profits were down $1 million from that period last year.

Alcoa made $10.7 million on $189.6 million sales in January-March 1959.

See No Price Relief—And the Alcoa chief sees no immediate relief in sight. In fact the pincers may even tighten.

"It can not be determined when we will be able to restore prices . . . or obtain additional price relief to offset what has been and probably will continue to be constantly increasing costs for labor and purchasing materials."

Aluminum contracts with United Steelworkers expire on Aug. 1, a month after the termination date in basic steel. Mr. Wilson feels wages should be held down, but he is not hopeful this can be done.

In the past, the union has settled with steel, then applied the same pattern to aluminum. The Alcoa head feels there are great differences in the economic situation of the two industries, but sees little chance for any departure from the usual practice.

Import Problems—In noting the competitive picture that apparently writes off chances for a higher price, Mr. Wilson points out that aluminum prices are now only 25 pct over the 1929 level. In addition to bumping heads with eager U. S. suppliers, Alcoa finds itself running into lower-priced imports — screw machine products 10¢ to 15¢ lower than U. S. made, and aluminum steel core wire being offered 35 pct under domestic prices.

When you get right down to it, the basic problem is oversupply, says Alcoa. "We believe the real solution for the problem is the development of new markets," says Frank L. Magee, Alcoa president. The company is confident on the long run, but slightly fearful that the current scramble may leave the industry saddled with unprofitable commitments.

Shows Promise—One of the most promising new markets is the automotive engine. Aluminum blocks are expected for at least one model next year, and all carmakers are known to be watching this closely.

Both Ford and General Motors have agreements with Reynolds Metals for molten aluminum for foundries near the potlines. The hot metal price is about 3¢ per lb less than pig. This arrangement would be a natural for aluminum engine blocks. But the tone of Mr. Wilson's remarks indicated he has serious doubts as to the economic soundness of such arrangements. But he did not rule out the possibility that Alcoa might get into it.

Overseas Selling — Foreign markets offer tremendous potential for increased aluminum use, says Alcoa's chief. At present exports are a small part of Alcoa's business. But the company's actions overseas leave no doubt it expects this growth to be dramatic.

In domestic markets, Alcoa will continue to bear down heavily on research and sales development. Mr. Magee indicated the company will take a less inhibited approach to the production of end products, will move into areas where potential markets are being overlooked for lack of the right end products.

Good Packaging Can Save Money

Westinghouse Program Shows How It's Done

A better method for packing electric motors at Westinghouse saves $50,000 a year.

Redesign of a refrigerator package meant annual savings of $250,000.

Package weight is cut and storage expenses can be reduced.—By K. W. Bennett.

▪ U. S. manufacturers will spend over $15 billion to wrap up the goods they manufacture this year. It will be the packaging engineer's job to put their output in packages which will be stronger, lighter, more attractive—and cost less than they did last year.

It can be done. Westinghouse Electric's "Wring-out" program produced an electric motor package that cut costs $50,000 per year. Corrugated boxboard replaced a wood case. The paper box is assembled easily, yet is strong enough to permit stacking everything but Westinghouse' largest electric motors.

Ways to Save—A Westinghouse packaging engineer at Columbus, Ohio has redesigned a refrigerator package for annual savings of $250,000 per year. His package eliminated two pads which held the refrigerator door closed in shipment. Paperboard now does the job, at reduced material and labor costs.

Harold J. Anderson, Westinghouse, points out new materials are one avenue to reduced packaging costs. Another route: A simpler loading of the container. Small parts, in one instance, were inserted by hand in a tube. A redesigned container is flat, can be loaded by machine.

Less Space, Less Weight—Small motors were formerly packed in large cartons. They are now packed in palletized units at a 50 pct saving. It's notable that the savings in the Westinghouse "Wring-out" program reduced package weight and materials costs. Yet the damage rate to goods shipped was kept within bounds. There are other savings. Storage expense has been axed. Motor packaging material at one plant occupies one-fifth the space required a few years ago.

Freight savings, due to lighter packaging, are so evident a design change was made in home laundry equipment to permit a different package recommended by the packaging engineer. The savings amount to $75,000 per year.

Make It Attractive—George Billings, G. H. Tennant Co., manufacturer of heavy industrial floor cleaning machines, comments, "It is incongruous and even dangerous, in a sales sense, to package a quality product in a shabby manner. . . . Packaging should create a favorable customer impression." The Japanese, he points out, are even packing their new hi-fi equipment in plush-lined cartons.

R. R. Newquist, president of Roots-Connersville Blower Division of Dresser Industries, told the American Management Association packaging Conference, "We are a capital goods manufacturer. But sales, research, and marketing sit in on our package design. (We aim at) a style that meets conditions of operation and has, in addition, a real appeal to the purchaser. It not only does a good job, but it is good to look at."

NYLON IN FOR METAL: Nylon film packages may replace conventional metal containers for oil and grease. Used as a drum liner, nylon could cut shipping weights for bulk greases. In addition as a quart pouch for motor oil it would cut packaging costs.

How One Foundry Cut Its Costs

Here's how a major ferrous foundry, with a highly successful cost control program, breaks down its cost program.

1. DIRECT LABOR— Control cost by use of measured day work, plus careful labor cost estimates when quoting on a new job. A base rate is established, and incentives are "one-for-one" over the base rate. A 10 pct output boost raises the worker's check by that same percentage.

2. DIRECT MATERIAL— Adjust iron mixtures to whatever iron will meet customer specifications, but allow use of whatever scrap grades are currently lower in price.

3. OVERHEAD— Figure this as representing ⅓ to ⅔ total manufacturing cost, but 55-80 pct of controllable cost. Figure only 10-20 pct of overhead cost as fixed (light, heat, taxes, insurance). Determine weekly cost of Departmental indirect labor; Production supplies; Equipment maintenance and repairs; Pattern and Flask expense; General plant labor. Submit weekly reports to management and each department supervisor—showing indirect labor costs as a percent of direct labor costs.

Founders: Back In Competition

Intensive cost-cutting campaigns have put many foundries back in competition.

They're regaining business and boosting profit at the same time. —By K. W. Bennett.

▪ Like Cinderella, the foundry industry has come out of the back kitchen a winner.

When nearly half the gray iron founders polled said they'd boost profits by 17 pct in 1959 (IRON AGE, Jan. 1), there was some doubt expressed by those outside the industry. But costs can be slashed. Here's how it's being done.

Carbon Dioxide Process—R. R. Ashley, American Standard, told the American Foundrymen's Society last week that cost per 1000 castings was reduced from $35.29 to a staggering $8.22 in a number of instances. The company is running 50 pct of its castings using carbon dioxide, a switch from grain sand molding.

It's now possible to use 75 pct reclaimed sand in the carbon dioxide molds. Mold production has gone from 35 molds per hr in green sand to 100 molds per hr, with a reduced work force. Business that was being lost to screw machine or forge production is being recaptured with reduced bids.

More Time Studies — On expanded use of motion and time studies: J. A. Westover, Westover Corp., reports a foundry which reduced the original estimate for a job from a previous 141 manhours to 84 hours, using standard time techniques.

Shell molding is another weapon in the foundry arsenal for recovering business lost to other processes. W. C. Capehart, Monsanto Chemical Corp., reports foundries will use 16 million lbs of resin in 1959, against about 13 million last year. The figure is expected to hit 20 million lbs in 1960.

To step up shell production, most foundrymen use 14 pct fixing agent with their shell resins, though 7 pct will reduce brittle molds. A few shell molders are pushing as high as 16 pct.

New Management Methods — New equipment and new techniques are slashing costs. Even more effective are new management techniques.

A growing number of foundries are hiring industrial engineering consultants. At a cost of $6000 to $18,000 per year, they are putting their plants on measured times.

Cost estimating on new jobs is much tighter.

Quality Control—Statistical quality control, reports B. M. Appleman, Texas Foundries, has cut customer returns in half. Manhours expended per ton of castings has been cut from 4.5 to less than 3 manhours. Scrap loss has been halved.

Raw materials cost is being checked. A large shop makes two monthly "raw materials price" lists. If steel scrap is low in price, it is favored over cast scrap.

Foundry management is a field to watch. Some of the top management cost programs in the U. S. today are coming from foundries. They're regaining business—and managing to boost profit at the same time.

Why Engineers Won't Unionize

A University of Michigan group polled professional men in 10 established companies.

Most engineers and scientists said unions weren't for them.—By H. R. Neal.

1959's Union-Management Crisis

▪ Are professional engineers and scientists headed toward unionism?

Traditionally, they have felt themselves to be an integral segment of industry's middle management. Older workers still feel this way. But some younger men are less satisfied with their professional and financial progress.

In the Minority—Interviews with more than 270 engineers and scientists in 10 well-established, well-managed companies show nearly 20 pct of these professional employees favored some form of collective bargaining to improve their salary and social status. And another 20 pct, opposed to the idea, presumably would change their mind if they thought they could benefit.

Of those who favor collective bargaining, half (or 10 pct of the total) give unqualified support for action along union lines. Others (8 pct of the total) specifically mentioned their professional societies (see box).

A Sampling of Union Sentiment

Two hundred and seventy engineers and scientists in 10 leading companies were asked, "What do you think of collective bargaining for yourself?" Their sentiment:

10 per cent favored bargaining along union lines.

8 per cent favored bargaining assistance from professional societies.

50 per cent were strongly opposed for any reason.

29 per cent were mildly opposed, and under changed circumstances, many might change their mind.

3 per cent had no opinion.

Depends on the Company—Between the companies studied, which included four chemical companies, two electronics manufacturers, two public utilities, and two automotive and automotive parts companies, there were significant differences in attitudes toward collective bargaining. In one company, only 1 in 10 favored some form of collective bargaining. In another 4 in 10 favored it.

The study was conducted by the Bureau of Labor Relations at the University of Michigan on the fundamental question: "How can we best utilize and motivate scientists and engineers?"

The question of attitude toward collective bargaining is only one of 25 topics. A complete analysis of this single topic titled "Unorganized Engineers' and Scientists' Opinions of Collective Bargaining for Professionals Like Themselves," will be published later this year.

No Mass Joining — Preliminary findings have been revealed by Prof. John W. Riegel, bureau director. He prefers to limit the analysis and conclusions to the companies studied, but believes the findings may be broader in their implications.

Prof. Riegel considers the pro-collective bargaining group a "sizable minority." He doesn't foresee a mass shift toward unionization by professional employees, but as engineering and scientific staffs continue to grow in size in the coming years he looks for it "to come here and there in particular spots."

Money Is Major Issue — The study shows there is no significant relationship between ratings of an individual's performance and his attitude toward collective bargaining. But there is a "quite high" relationship between how an individual feels about his salary and how he views collective bargaining—and it's

not limited to lower-salaried employees.

Dissatisfaction over salaries and adjustments was the primary reason cited by those favoring collective bargaining along union lines. Lack of communication with management concerning an individual's status and the desire to obtain more favorable terms of employments were also mentioned.

Poor Communications — "Most gripes about salary are on the basis of personal adjustment," Prof. Riegel says. Some typical complaints: "I don't know why I'm paid what I am." and "I get a raise and don't know why." and "We don't know where we stand."

He sees no reason why employers should continue to regard wage information as a secret and even sees possible harm in it.

Variety Preferred—But there is more to the problem than wages. Engineers and scientists also want to derive a sense of accomplishment from their work.

"The best engineers and scientists, and that includes the majority of those interviewed, are interested in opportunity for continuing their education—more than any other group I know of in business. They speak of variety and want work assignments which will help them advance professionally. They fight against routine."

Those engaged in exploratory and creative work are concerned whether it would be properly evaluated by a collective bargaining process. Because their assignments are novel and varied, their work cannot be placed in familiar, stable classifications.

Good Supervision Vital—Where people are engrossed in new fields, such as chemicals and electronics, professional employees are generally well paid and satisfied, according to Prof. Riegel. But there is also a greater possibility for a shortage of qualified supervisors which can lead to dissatisfaction over "treatment" —proper recognition for accomplishments, information on progress.

Currently, there are few if any unions or bargaining associations representing engineers and scientists. A number claim these groups among their membership, but the primary membership is made up of technical classifications. Usually, the professional members are working at technical jobs such as drawing boards or as technicians—jobs also filled by non-professionals.

Craft Unions Shunned—Significantly, none of the pro-collective bargaining group mentioned an alliance of a professionals' union with a manual workers' union, and none indicated a desire to have a professional union as a branch of a manual workers' organization.

Summing up, Prof. Riegel concludes collective bargaining could assist professionals in economic areas, but probably not in the highly important area of intangible rewards.

Work-Motivation—In general he notes, scientists and engineers are work-centered, deriving keen satisfaction from their achievements. They also share managements' concern for productivity. And to the extent management gives both tangible and intangible recognition to their achievement, it can motivate professionals to do their best work.

Three Main Drawbacks—There were three principal reasons for opposition to collective bargaining for scientists and engineers: It would offer no advantages, and might even be harmful; salaries and promotions would not reflect the individual's responsibilities, performance, or qualifications; and it would reduce professional productivity and development.

Are Societies the Answer?

■ Some engineers who would like to see collective bargaining in their profession believe that a professional society, rather than a union, would make their best bargaining agent.

But Prof. J. W. Riegel, director, Michigan University Bureau of Labor Relations, thinks it improbable for two reasons:

1. Society memberships usually include several groups with different interests—employers, managers, consultants, teachers, public and industrial employees. For a society to engage in collective bargaining would probably cause serious factional discord.

2. The main function of societies has been to inform members of technical developments in their field, to promote standards, to speak for members on public issues, and to serve as employment agencies for members.

But Prof. Riegel believes societies and employers can do something to provide meaningful wage data "in view of the critical importance of engineers' and scientists' satisfaction with pay. . . ." He suggests:

1. Better job classification and salary surveys by employers. This would improve knowledge of the market for professional services and reduce unwarranted differences in salaries paid for similar work.

2. Executives should explain, to those who ask for it, the evaluation procedures used in setting rates for uncommon positions held by engineers and scientists.

This is no easy task, Dr. Riegel admits: "Possibly the most difficult part of salary administration for managers of professional work is the adjustment of each individual's pay so that it reflects his performance and contribution, and yet remains within the approved range for work of that type and grade."

Inside India's Steel Expansion

West Outshines East in Mill Building Efficiency

British, Germans, Russians and Americans have been building steel mills in India.

Kaiser Engineers finished two months ago. The Russians have months to go. — By G. J. McManus.

▪ Without too much fanfare, the expansion program of India's Tata Iron & Steel Co., Ltd., was completed two months ago.

The finish came about 36 months after construction was started by Kaiser Engineers in May of 1956. It came almost a year before the expected completion date of a steel mill being built in India with Russian equipment and assistance.

British and German mills for India are still two years away from full operation.

West vs. East—All four projects are part of a bootstrap operation aimed at lifting India's steelmaking capacity from two million tons a year to six million tons a year. The Tata mill is in the private sector; the other three state owned.

This split has turned India's program into a race with broad political and economic aspects. On the one hand, you have private operation and American enterprise. On the other there is state ownership and in one case, Russian dedication.

Capacity Almost Doubled—The projects involved are not exactly comparable and it is too soon to assess the Russian effort fully. But enough has happened to help reshape Indian notions on the effectiveness of private capital in providing fast industrialization.

In a period of 36 months Tata has added 800,000 tons to the capacity of its plant at Jamshedpur. The program has raised Tata's capacity to two million tons. It has put in operation a new blast furnace, two openhearths, a Bessemer converter, a blooming mill, a billet mill, and a structural mill.

Coke ovens, sintering facilities, soaking pits, power generators and rail lines have been added.

Curtain Calls—Credit for this accomplishment goes first to the House of Tata, parent company of the steel works, and to its present head, J. R. D. Tata.

In December of 1955, he signed up Kaiser Engineers as prime contractor for the Jamshedpur expansion. Six months later he negotiated a loan of $75 million from the World Bank (biggest ever).

Kaiser knew it had taken on a rugged assignment; the 30-month time schedule for Jamshedpur is said to have scared other builders away. The job called for speed and Kaiser got off running.

Fast Decision-Making — Orders for bottleneck items were placed first, without waiting for the whole project to be engineered. Procurement offices were set up in London, Dusseldorf, and Tokyo. With rapid fire decisions cutting through red tape, actual construction began four months after notice to proceed. The project was completed in March of this year.

The job ran about six months over schedule. There would probably not have been even this small runover were it not for the jamming of the Suez and labor troubles.

Also Running—The British and German projects are said to be badly behind schedule. Exact progress of the Russian mill is difficult to determine, partly because of secrecy and partly because neither Tata nor Kaiser is going out of its way to make comparisons that might embarrass the Indian government.

From what can be learned, initial phases of the work were definitely

PIG IRON FOR INDIA: New blast furnace "F," built by Kaiser Engineers Overseas Corp. for Tata Iron & Steel Co., Ltd., at Jamshedpur, India, is lighted by Binodanand Jha, minister of labor, and R. H. Ahir of Tata.

snafued. The government was responsible for the excavation and general construction work; the Russians were to supply equipment and see to its installation.

Russians Had Troubles — Construction phases were reportedly slowed by complicated contracting methods and by a tendency to pass decisions up the line. Early accounts described the Russians sitting around with stacks of equipment and no place to put it.

More recent reports say the Russians are making respectable progress. Best estimate is their construction time will run 3.3 years as compared with 2.8 years for Tata.

A Management Lesson—Perhaps the biggest fact coming out of India's steel program is that the great need for this and other new nations is not just equipment and money but management competence. In this area private enterprise came out first by a wide advantage. Tata and Kaiser got things done because they were able to make spot decisions, to foresee needs, to organize and drive and act.

The whole performance leaves a number of current assumptions up for questioning. Among these is the notion that Americans cannot match the Russians in spreading industrial ways among depressed peoples. Kaiser's small group of technicians handled the training of 20,000 Indians as a routine event.

Myths Exploded—A second big myth may be the notion that Russians are good mixers in Eastern countries while our people isolate themselves. On the Tata project American technicians appear to have mingled freely and cordially with Indians. The Russians, on the other hand, are said to have fenced themselves in.

Finally, there is the idea that capitalism is not suited to Asia because of different talents, temperaments, and climates. The ability of Tata to thrive under both British and local governments seems to disprove this. Moreover, the experience of Tata is being duplicated throughout India.

Colleges Spend on Research

Engineering research took the lion's share of physical science research and development money spent by American Colleges and Universities in fiscal 1954, last available figures.

And physical science probing took the major part of the total. Here's the picture painted by the National Science Foundation.

	Total Spent	Basic Research	Other
ALL RESEARCH	$205,475	$127,543	$77,933
Physical Science	118,301	67,860	50,441
Engineering	62,790	25,529	37,261
Electrical	18,375	6,158	12,217
Aeronautical	14,184	6,994	7,190
General	12,970	3,307	9,663
Mechanical	5,194	2,877	2,317
Chemical	3,932	2,125	1,807
Civil & Sanitary	3,503	1,746	1,757
Metallurgical, mining & petroleum	3,008	1,702	1,306
Ceramic	863	435	428
Industrial	662	184	477
Architectural	99	2	97

(thousands of dollars)

College Research

▪ The absent-minded professor who spends all the time he can snatch from the classroom alone in his musty lab working on an abstract pet project is all but extinct.

First of all, he now works with at least one associate. A recent report by the National Science Foundation, on scientific research and development in colleges and universities, says, "The prewar individualistic approach has been to a large extent supplanted by the team-type project."

Truth That Pays—They still seek truth. But now they have a good idea of how their work can economically be used. And they are reasonably endowed in most cases. The NSF says, "Often this type of project is initiated by the financial sponsor to develop an end product."

Also, no longer is research time of the teacher relegated to odd moments. The average teaching researcher spends only 60 pct of his time in the classroom. More specifically, the engineering prober in a university teaches 68 pct of the time.

NSF statistics are for 1954, the last year complete records are available.

Spent for Research — The total separately budgeted for research and development by universities was $205 million. The federal government contributed $141.7 million. Industry, foundations, and others accounted for $46.3 million. And the seats of learning used their own money for the rest.

How to Weld Aluminum Foil

SOUND PROCESS: Aluminum Co. of America now uses ultrasonics, high frequency sound waves, to join the ends of aluminum foil coils while they are still in the mill. Formerly, Alcoa had to stop rolling to apply an adhesive. The joint is strong enough to support a 50-lb cake of ice. It was developed by Alcoa and Aeroproject, Inc., West Chester, Pa.

Linepipe Capacity

Bethlehem Steel Co.'s linepipe capacity at Steelton, Pa. is 420,000 tons a year.

Sizes made range from 18 in. O.D. to 42 in. O.D. The 42-in. size is the largest linepipe made in the industry according to Bethlehem.

Labor Dept. Reports Steelworker Output

Production per man-hour in basic steel fell 6.2 pct between 1956 and 1958, according to the U. S. Dept. of Labor.

The decline between 1957 and 1958 was 5.1 pct.

The Dept. of Labor report will give comfort to the steel companies in their forthcoming contract negotiations with the United Steelworkers. It will force union statisticians to run for their slide rules to refute the report.

In Contention—In pre-negotiation skirmishes with steel companies, the union has argued it is entitled to higher wages on the basis of worker productivity.

The steel mills have contended that output per man-hour is no basis for a change in steelworker wages. In a letter to David J. McDonald, union chief, last week, 12 major steel companies made this point:

"(We explained that) output per manhour is no measure of productivity, and that factors other than labor input are the significant contributors to and major claimants upon any resulting improved productivity.

"To illustrate only one problem in the use of output per man-hour figures, let us remind you that in the period of 1956-57-58 output per man-hour in the steel industry declined more than 7.5 pct, while steelworker average hourly employment cost went up nearly 19 pct. Thus you can see what would have happened had wages been tied to output per man-hour over the immediate past."

The Difference—(The difference between the Labor Dept. figures and the steel companies is chiefly because steel makers estimated the 1958 figure on the basis of their own computations).

Actually, the productivity figures have come to mean little or nothing of any practical value. The reason: Productivity moves in relation to whether business is good or bad in steel and other industries. So either side could prove a case, depending on which set of years he chose.

Steel Labor Talks

Negotiations between 12 major steel companies and the United Steelworkers of America for a new contract will get underway in New York on May 5. Opening of negotiations was scheduled originally for May 18.

Allis-Chalmers Settles

About 14,000 UAW-AFL-CIO workers at eight Allis Chalmers Co. plants have come to agreement on terms of a new contract. They have been on strike since Feb. 2.

The contracts, which expire Nov. 1, 1961, call for wage increases, continuation of cost-of-living, increased pension and SUB benefits, and improved life insurance plans.

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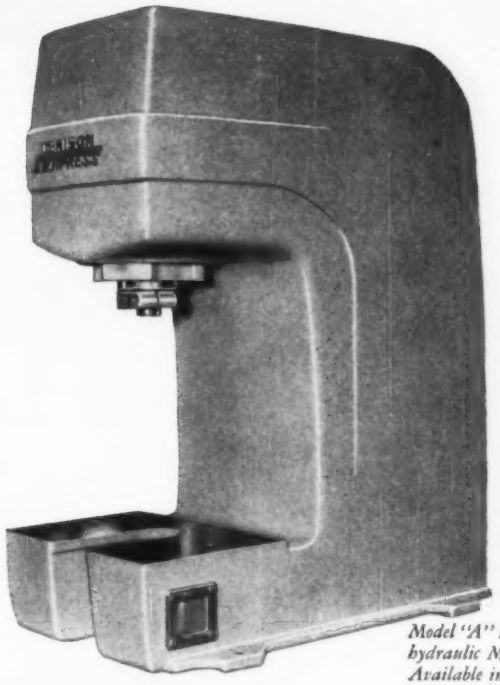

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J. Lawrence Buell, Jr.

Who's Afraid of Big Business?

Mr. Buell would allay the fears of small business men regarding industrial giants.

He foresees many years of profitable relationship ahead for both.

▪ J. Lawrence Buell, Jr., is a rarity in the business world. As a small businessman, he is a champion of big business—for the other fellow.

His aim is to run his firm, Formsprag Co., Warren, Mich., with the efficiency of an industrial giant.

Mr. Buell learned to appreciate big business efficiency while working for Reliance Electric & Engineering Co. for over 25 years. "But," he admits, "it always has been my ambition to head a small manufacturing company and run it on the same efficient lines as a large, modern corporation."

Makes the Change — When the opportunity came up to join Formsprag as its president in 1953, Mr. Buell made the change. But now that he's a small businessman, his attitude toward big business hasn't changed. He believes there is plenty of room in the world for both small and large companies.

"We at Formsprag have no fear of being crushed by big business," he explains. "Rather, we wish big business every success. Why not? We are happy to number some of the nation's largest manufacturers among our best customers."

His Company Grows—Under his guidance, Formsprag has become the world's largest exclusive producer of over-running clutches, with representation in 29 countries.

"So long as we continue to provide large companies with a better product in our specialized field than they can produce themselves, we are confident that we shall continue to enjoy their patronage," he states.

J. LAWRENCE BUELL, JR.: We wish big business every success.

A Specialized Role — Mr. Buell regards the big business-small business relationship as one of mutual help. As he sees it, big business is not completely self-sufficient nor is it ever likely to become so. For that reason, he explains, big business and small business must join hands in a partnership of mutual helpfulness.

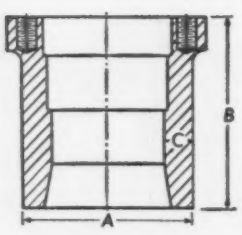
"The most significant contribution a small company can make to this partnership is through specialization," Mr. Buell continues. "This may be done by turning out one particular product or service that the larger company cannot hope to match." Often, this contribution has proved an all-important factor in the big partner's success, he adds.

His Background—Mr. Buell, who was born in Springfield, Mass., in 1906, moved to Detroit with his family when a child. He was graduated from the University of Michigan in 1927 with a degree in engineering.

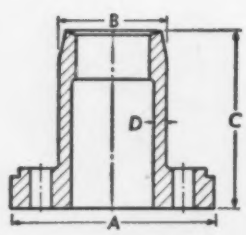
Now a resident of Grosse Point, Mich., he is active in community life —vice president of Warren Township Chamber of Commerce, Grosse Point Farms councilman, president of the board of trustees, South Macomb Hospital Corp., and a spark plug in the South Macomb County United Foundation.

THIS HOLE IN GRAPH-MO HOLLOW-BAR®

lets you make ring-shaped tool steel parts faster, at less cost



BLANKING AND FORMING PUNCH



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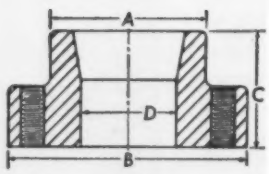

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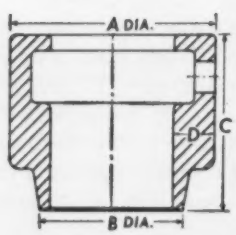


SIZING SLEEVE

START making your ring-shaped tool steel parts with Graph-Mo Hollow-Bar® and you save one operation immediately. You eliminate drilling because the hole is already there. Your first step is finish boring.

That's just the start of your savings. You can make parts faster because Graph-Mo machines 30% faster than ordinary tool steels. The free graphite in its structure is the reason.

Graph-Mo wears longer because of the diamond-hard carbides in its structure. Users report Graph-Mo outwears conventional tool steels by 3 to 1. And there's far less tendency to pick up, scuff and gall.

And for stability, you can't beat Graph-Mo anywhere. A master plug gage machined from Graph-Mo showed less than 10 millionths of an inch dimensional change *after 12 years of use.*

For your ring-shaped parts, save as other tool makers do. Specify Graph-Mo Hollow-Bar. It will save you time and money, give you better finished products. Sizes range from 2 to 16-inch O.D. Many wall thicknesses. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

WHEN YOU BUY TIMKEN STEEL YOU GET . . .

1. Quality that's uniform from heat to heat, bar to bar, order to order
2. Service from the experts in specialty steel
3. Over 40 years experience in solving tough steel problems

TIMKEN® *Fine Alloy* STEEL

"TIMKEN GRAPHITIC STEELS ARE CARRIED IN STOCK BY 9 DISTRIBUTORS WITH 42 WAREHOUSES IN 31 CITIES IN THE UNITED STATES AND CANADA"

Business Relaxes Economy Drive

With most business on the upgrade, stringent economy measures are being relaxed.

Outwardly, strict economy is still the word, but new equipment can get by if it's needed. It's a big assist to the recovery.

▪ Most companies are letting up on the strict economy that has dominated the corporate state of mind since early 1958.

New secretaries are being hired; "quits" are replaced right away. Merit raises are asked in department budgets, and are getting through previously airtight financial committees.

Broad Effects—This type of financial thaw is something to be considered in making your forecasts for the second half. While individual items may not seem much to you, a universal trend is a big factor in overall business.

New office equipment is being ordered, worn-out typewriters replaced, offices are being refurnished. Plans to install automatic equipment are being revived. The same thing is going on in the shop.

Not Deferred—One of the major capital goods makers reports it has more new business under study now than at any time in over a year. This is the rule, not the exception among these recession-hit manufacturers.

Many company expenditures are like consumer durables—discretionary and deferrable. Now, the attitude is changing from deferring to reconsidering. More and more, reconsiderations mean decisions to hire, replace,order and buy.

It is not likely that the easing of the general economy kick will result in a major capital equipment boom-yet. Instead, it is first reaching the minor expenditures that can no longer be deferred, or where it can be shown that not spending is false economy.

P.A.'s Relax—But don't sell it short. That attitude is behind much of the recent gains in employment, the record rate of consumer spending, and a lot of the increases in sales of durable goods.

Outwardly, the change in attitude is not too apparent. Except for the basic metals, purchasing agents are as tough as six months ago. But their attitude will start easing soon. It's still the rule to count on the hard sell, but they can be sold.

FRB Index at New Record, Still Climbing

▪ With the FRB's Index of Industrial Production soaring to a new high in March, two questions follow:

How high will it go before June? How much will it fall off later this summer?

Except for the interest in new records, the extent of the Index's expected climb through June is only relative. What is important is that it is rising on what might be called a broad front. Steel is leading the way, but it is backed up by other factors.

Wide Range—In reaching 147, passing the previous high of 146 set in February of 1957, the Index showed gains over a wide range of manufacturing. Some points of interest:

Output of construction materials continued to gain. Producers' durable goods industries increased production with farm equipment and other machinery still on the rise.

Production of household durables is at a near record. Auto production is gaining significantly. Production of nondurables rose to a level 6 pct over the pre-recession level in 1957.

Construction, Too—Another encouraging factor is the rate of home construction. Housing starts rose 5 pct in March to a respectable annual rate of almost 1.4 million units. At the same time, total new construction put in place hit a record rate. Increases in public construction and private commercial building offset declines in utilities and industrial construction during the month.

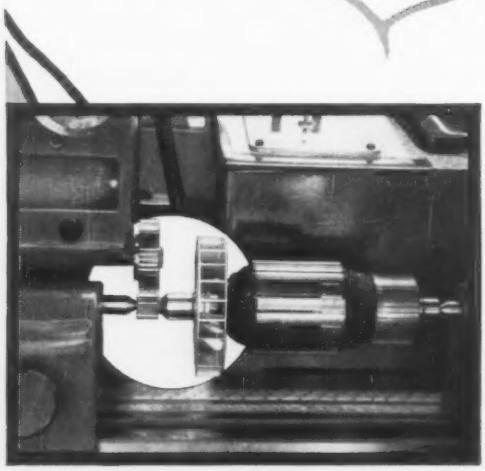
What will happen after June is anybody's guess. But with other segments of business on the upgrade, steel's inflated rate becomes less dominant and there is less talk of a collapse after the steel labor settlement.

Key areas to watch are consumer durables and industrial equipment.

If housing starts continue to pick up, the strengthening appliance market is likely to hold. In other areas, consumers are showing new confidence, and backing it up with spending.

A capital goods boom is not likely now, but some substantial industrial spending is probable.

GEARED to give lightweights heavyweight power!



Fellows Inspection Instrument checks gear at a major gear-motor manufacturer. Integrated Fellows production and inspection equipment assures dependable quality control.

Power used to mean *weight*, too, but not any more; modern gear-motors pack immense power in a small volume, deliver maximum output per pound. Light executive aircraft use powered accessories only large planes could carry ten years ago. Products as diverse as home appliances and machine tools have grown steadily more powerful while shrinking in size and weight.

Accurate, dependable gears produced on Fellows equipment are essential to the performance of many of these mighty midgets. Their operation must be relatively smooth and quiet, even with the high reduction ratios required in many of them. Here, as in many other applications, Fellows Gear Shapers combine accuracy with production speed and low unit cost.

Your own gear production needs, from 1/16" to 120" pitch diameter, can probably be met more efficiently and profitably with Fellows equipment. For full information, get in touch with any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Avenue, Royal Oak, Mich.
150 West Pleasant Avenue, Maywood, N. J.
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6214 West Manchester Avenue, Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

Gas Mileage Climbs in '59 Cars

Mobilgas Economy Run Has Something for Everybody

Most models showed improvement over last year in miles-per-gallon ratings.

Rambler American made best overall showing. Other compact cars did well.—By H. R. Neal.

▪ The nice thing about the annual Mobilgas economy run, as one observer sagely noted on his return from the finish line, there are enough winners to give nearly everybody something to crow about. This year's 1898 mile run from Los Angeles to Kansas City saw 47 entries average 19.44 mpg, nearly 0.75 mpg better than the 1958 run.

Rules changes this year make comparisons with previous runnings difficult and largely meaningless. In the past official results were given in terms of ton-miles-per-gallon—weight of a vehicle times distance, divided by gallons of gasoline used. This year's results are strictly miles-per-gallon.

Compact Cars Shine—The results showed there's something to the economy claims of compact car manufacturers. Four of the top five performances were made by compact cars.

Best overall mileage was turned in by a Rambler American. The 100-in. wheelbase, 90 hp car averaged 25.28 mpg over the course—more than 2 mpg better than the next closest average. Next best showing was by a 108-in. wheelbase Rambler 6 with 22.96 mpg. A Studebaker Lark 6 followed with 22.44 mpg.

Lark Leads V8's — Rambler's best performance, according to company officials, came in 1951 when a small Rambler averaged 31.05 mpg. However, they pointed out, the car was equipped with overdrive instead of an automatic transmission that year and the engine developed only 82 hp. Best mileage ever obtained in the economy run was made in 1936 when a Willys four-cylinder entry averaged 33.21 mpg.

Best showing among V8 entries was made by a Studebaker Lark—22.28 mpg, but this was unrecognized in the official standings, as there was no separate category for V8-powered compact cars.

Moral Victory?—Competing in the low-price, six-cylinder class, two Chevrolet's were close enough to embarrass the economy pitch of the compact cars, turning up averages of 22.38 and 21.94 mpg, and claiming title to "Class B" honors.

Plymouth scored a double win in "Class C", for low-price V8's with 21.15 and 20.98 mpg. However, Dodge, in the next class for low-medium price vehicles, made a better showing in grabbing first and second—21.75 and 21.02 mpg.

Upper Bracket Results — The upper-medium price honors went to a Ford Thunderbird with 19.13 mpg. A Chrysler Saratoga was close behind with 19.07 mpg and a De Soto Firedome with a showing of 19.06 mpg.

A Cadillac 62 was close behind with 19.04 mpg and was acclaimed

No Excuse for Crossed Wires

WIRING HARNESS TEST: An automobile wiring harness gets a 67-point electronic test at Mercury-Edsel-Lincoln quality control test center, Wayne, Mich. A faulty wire, connection, or bulb will stop dial on equipment.

mileage king of high-priced cars. Imperial, last year's winner on a ton-mile basis, was far behind with 18.20 mpg. And a Lincoln was just as far behind Imperial with 17.27 mpg.

Last in line for all of the 47 makes and models was an Oldsmobile Super 88 with an average of 16.77 mpg. Just above it was an Olds 98 with 16.87 mpg.

Battle of the Sexes—For the men who complain about the way women drive it's interesting to note women drivers won in two categories — The Chevrolet 6 and Dodge. Men drivers averaged 19.46 mpg, women average 19.39 mpg. For the publicity value, Dodge continued the competition between its male and female drivers in a mileage contest from Kansas City to New York.

To make the car owner receiving low mileage feel a little worse: A diesel powered Mercedes - Benz 190-D recently completed a cross-country trip averaging 41.04 mpg and at a cost of 0.6 cents a mile for fuel.

Almost Unbelievable—However, the ultimate in driving economy was recently posted by an engineer for Standard Oil of Indiana—97 miles on a single gallon of gas. The record was made in a Lark 6, but in something less than "standard" condition.

The car was stripped of its accessories: Generator, fan and belt, water pump, radiator, headlights, shock absorbers, door and window regulator handles, hub caps, grille, seat cushions, and just about everything else that could be removed.

The regular carburetor was used —but only the economy jet was utilized. The drive shaft was realigned to run straight to the rear axle. Tread was shaved from the tires, except from the crown, inflation pressures were upped to 80 psi.

Not for Average Drivers—But before car owners rush out to compare the mileage they receive on their own gasoline buggies, they should be prepared to accept considerably lower results.

It's highly unlikely the average motorist in a comparable car and using his normal driving habits could come within 3 to 5 mpg of the mileage posted by the experts. Some would undoubtedly be lucky to come as close as this.

Some Tips — But drivers in the economy run agree nearly everyone can get better mileage than they presently do by driving a little more carefully and courteously.

Speed, jack-rabbit starts, and useless engine idling are among the worst gas wasters, they say. For example, a car going 80 mph uses nearly 50 pct more gas than one going 50 mph. And an engine that idles for more than one minute will use up more gas than is needed to start it again.

Automotive Production

WEEK ENDING	CARS	TRUCKS
April 18, 1959	135,433	26,144
April 11, 1959	133,202	25,895
April 19, 1958	73,219	16,656
April 12, 1958	84,997	16,863
TO DATE 1959	1,951,874	375,088
TO DATE 1958	1,448,803	274,130

*Preliminary Source: Ward's Reports

The Bull of the Woods

SM-M-MPH--M-M-M-AAH--TH' BREATH OF SPRING! SM-M-M-PH--SM-A-AAH--LIKE NECTAR TO YOUR SOUL!
MY, YES! IT'S LOVELY OUT, AIN'T IT? IT'S WONDERFUL TO BE ALIVE, AIN'T IT?
YES--TH' NODDIN' DAISIES--TH' DRONIN' BEES--TH' GAMBOLIN' LAMBS--TH' PERFUME OF BLOSSOMS--TH' FRESH SMELL OF NEW TURNED EARTH! BOY, IT'S WONDERFUL IF YOU JUST SHUT YOUR EYES AND HOLD YOUR NOSE!
T.M. Reg. U.S. Pat. Off.
HEROES ARE MADE-NOT BORN
© 1959 by NEA Service, Inc.

Detroit Briefs

Aluminum Engines—Aluminum engine is out for the 1960 model of Plymouth's small car, according to the latest report. When it does come, probably in 1961, the block will be die cast. Chevrolet's aluminum engine, with the block to be cased in permanent molds, seems to be a little behind schedule, but not enough to cause a serious production delay.

In Chrysler's Family — Model line-up for 1960 will be reduced by De Soto. The division will offer six models on a single 122 in. wheelbase, compared with its present 18 models on two wheelbases of 122 in. and 126 in. Dodge-Plymouth dual dealerships are said to be due for a split, with Dodge to go it alone.

3 GREAT NEW Motoblox®

engineered for today's demands

by Vaughn®

HRK

Exceptionally effective cooling on the Vaughn HRK Motoblox is provided by water circulating in the interior of the 27" diameter intermediate blocks, augmented by an external blast of air. Ample wire storage is assured by offsetting the individual block units on this "straight-through" rod machine.

HFVX

Superseding a previous model, the Vaughn HFVX Motoblox is the ideal machine for drawing the smaller sizes of alloy and high carbon steels. Speed, cooling, flexibility, and safety are effectively combined in this modern Motoblox.

HFFV

For those still finer sizes that are preferably drawn *dry*, the Vaughn HFFV Motoblox is the answer! Sizes ranging from .025" diameter and finer may be finished on this 8" diameter block version of the Motoblox, with or without spooler.

"Quick on the Draw!"

THE VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

LINDE packaged oxygen plant sets nine-year record for availability!

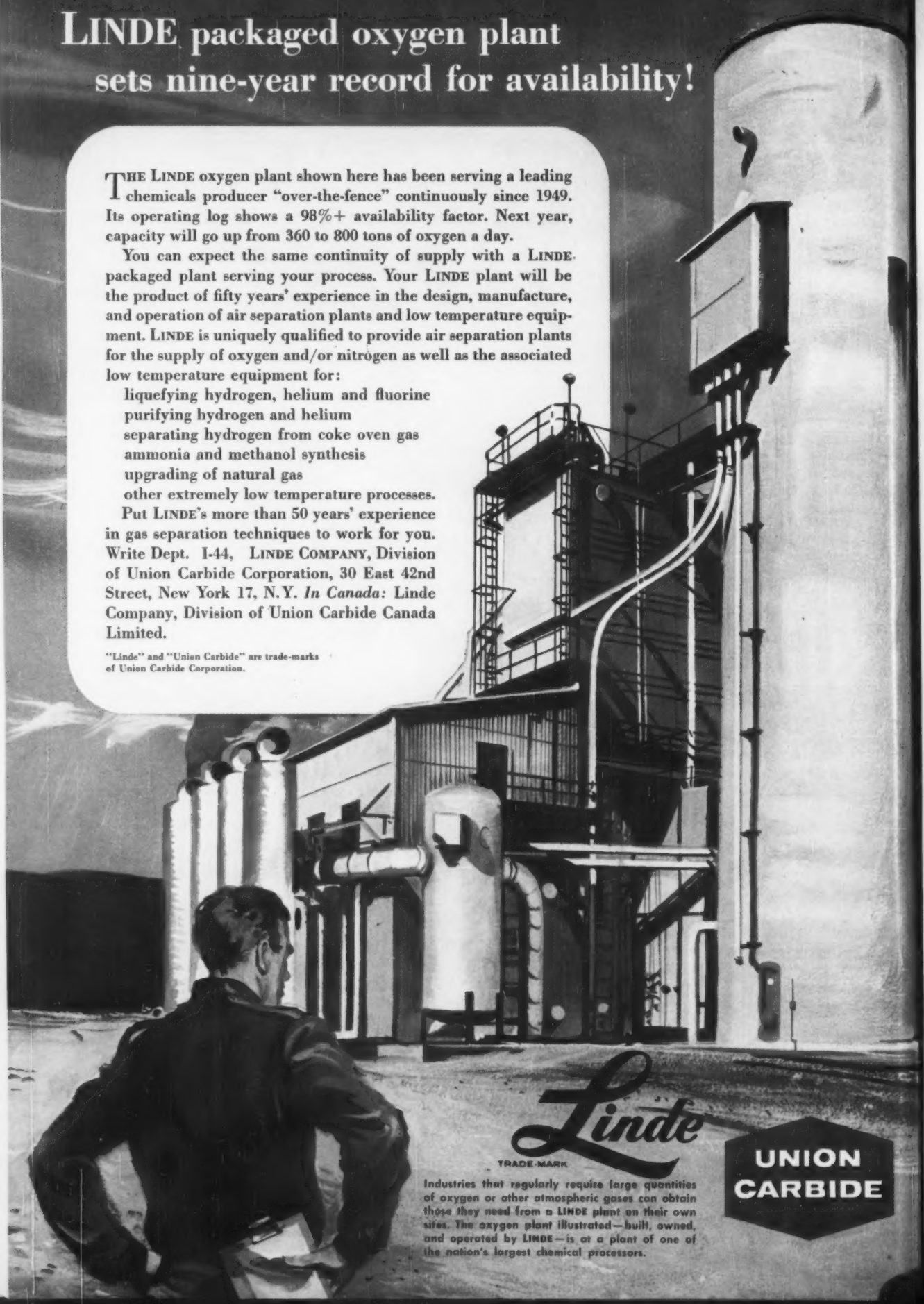
THE LINDE oxygen plant shown here has been serving a leading chemicals producer "over-the-fence" continuously since 1949. Its operating log shows a 98%+ availability factor. Next year, capacity will go up from 360 to 800 tons of oxygen a day.

You can expect the same continuity of supply with a LINDE packaged plant serving your process. Your LINDE plant will be the product of fifty years' experience in the design, manufacture, and operation of air separation plants and low temperature equipment. LINDE is uniquely qualified to provide air separation plants for the supply of oxygen and/or nitrogen as well as the associated low temperature equipment for:

liquefying hydrogen, helium and fluorine
purifying hydrogen and helium
separating hydrogen from coke oven gas
ammonia and methanol synthesis
upgrading of natural gas
other extremely low temperature processes.

Put LINDE's more than 50 years' experience in gas separation techniques to work for you. Write Dept. I-44, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

"Linde" and "Union Carbide" are trade-marks of Union Carbide Corporation.



Linde
TRADE-MARK

UNION CARBIDE

Industries that regularly require large quantities of oxygen or other atmospheric gases can obtain those they need from a LINDE plant on their own sites. The oxygen plant illustrated—built, owned, and operated by LINDE—is at a plant of one of the nation's largest chemical processors.

Higher Taxes Loom Ahead

The Government Is Spending More Than it Takes

You won't hear much about this now because 1960 is a national election year.

But Federal spending plans will need more money sooner or later.—By G. H. Baker.

▪ Higher taxes are coming. Why? Because the government continues to take in less money than it spends. And the cold war is becoming more expensive.

Revenues are now on the upgrade, due to healthier business and bigger payrolls. But federal spending is nudging ahead of all expectations.

Hot Issue — Neither political party is anxious to talk about higher taxes this year. Control of both the White House and the Congress is at stake in 1960 national elections. Any issue that might annoy the voters is being soft-pedaled. (Some experts are still clucking over Gov. Rockefeller of New York raising taxes this year and getting away with it.)

Root of the government's money problem is the hard fact that Washington wants to hand out more dollars than it takes in. And the cost of operating government programs keeps going up. Each year, the Congress adds new programs or enlarges old ones. Both so-called defense programs and civilian-type programs (such as veterans benefits and foreign aid) tend to spread, year by year.

More Spending — Examples: Built-in increases in such federal programs as flood control, housing, and education will automatically add about $2 billion to next year's budget.

Also, the cost of missiles is going up. And exploration of outer space, still in its infancy, is going to be an astonishingly expensive project.

Yet, all these programs are "essential," the White House declares. And Congress agrees.

Tax Targets—Whose taxes can be increased? The Committee for Economic Development (group of industrial executives) warns that upper-income individuals and corporations are already taxed to the limit (91 pct on top personal incomes and 52 pct on corporations). Left to tax are only middle and lower incomes, or a national sales tax.

Outlook: The next annual budget to be prepared by the White House will call for nearly $3 billion more than the $77 billion-plus asked this year.

Since revenues this year will fail by about $10 billion to cover expenses, the outlook is for a widening spread between income and outgo. Tax increases — sooner or later—are inevitable.

High Cost of Jobless Pay

Higher Tax For Business—Most businessmen will pay higher unemployment compensation taxes if Congress approves plans to impose federal standards on state jobless pay programs.

Many small firms will pay these taxes for the first time.

A pending proposal by Sen. John F. Kennedy (D., Mass.), would require all states to pay a weekly benefit to jobless workers equal to at least two-thirds of the average wage in each state for at least 39 weeks. Most states now pay under $50 for 26 weeks or less.

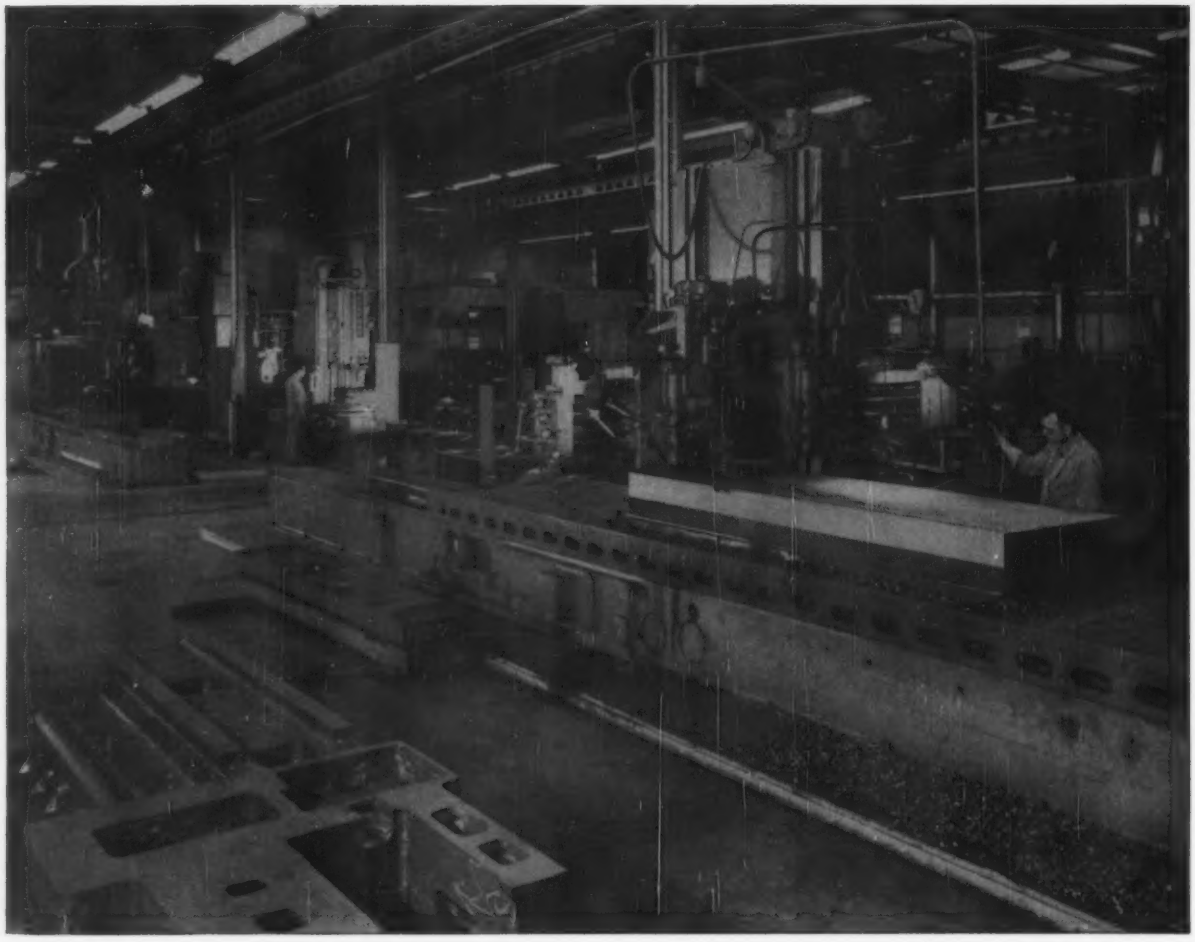
Coverage would be extended to firms with only one worker. Present standards call for only those with four or more to be covered. Employers who are covered pay a tax up to 3 pct of each employees first $3000 yearly salary. This would be boosted to $4200.

No Favor — In addition, the Kennedy proposal would remove the so-called merit rating system, by which firms with steady employment records pay a slightly lower tax.

President Eisenhower is opposed. But he is urging the states to voluntarily raise their standards. He wants them to pay at least 50 pct of the average state wages for at least 26 weeks. He also wants coverage extended to bring in firms with one worker.

Would Mean Changes—In practice, few states now meet the government's minimum standards. And they have shown little disposition in the past to follow recommendations such as the President is now making. Backers of the Kennedy bill argue that legislation is the only method of securing broader unemployment pay.

Businessmen are opposing the Kennedy bill on the grounds that jobless pay is a state responsibility, and imposition of mandatory federal standards will cost taxpayers billions.



Rapid-travel planer at Freitag's Plant.

New Facilities Make Salem-Brosius Prime Factor in Nuclear Energy Program

When Salem-Brosius' subsidiary, the Alloy Mfg. Corp., acquired R. H. Freitag Mfg. Co., Salem-Brosius became an integrated supplier of parts and components for the nuclear energy program. This additional 110,000 sq. ft. of precision machining capacity joins with Alloy's AEC and U.S. Navy approved fabricating capacity, permitting complete production control of nuclear contracts.

Freitag's product list is diversified, including plastic molding, rubber molding, stamping and die casting dies; jigs, fixtures, tools, gages and production—as well as precision—machining of components for industrial, commercial and consumer products of all kinds. This manufacturing capacity complements the complete engineering and erection service offered by Salem-Brosius on furnaces, plants, production lines and processing plants for steel, non-ferrous metals, glass and many other production industries.

Here's what this can mean to you. If you have a product or part in the idea stage, Salem-Brosius will help you design it, do any or all precision fabricating, welding and machining to the closest acceptable tolerances and deliver or install the job with all responsibility for good workmanship and speed of delivery under one control.

If you see advantage in this, send your next inquiry to Salem-Brosius, Inc.

SALEM-BROSIUS, INC.

PITTSBURGH, PENNSYLVANIA

Salem Engineering Limited, Toronto, Ontario • Salem Engineering Co., Ltd., London & Milford, England • Salem-Brosius, S.A., Luxembourg • Salem-Brosius, S.A., Paris, France • Alloy Manufacturing Corp., Pittsburgh, Pennsylvania • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pennsylvania.

Blueprint for Selling the West

Latest Report on New and Expanding Plants

Wherever you go in the West from Arizona to Alaska there are new plants and expanding ones.

Here, as possible prospects for a sales call, is the latest list. —By R. R. Kay.

▪ Are you getting your share of metalworking's Farwest growth? If not, here's an up-to-the-minute report on new and expanding plants there—and what they make. They're all good and immediate prospects for equipment, materials, and services.

Sales managers could benefit by telling their salesmen to call on these plants:

Pacific Tube Co., Los Angeles. This firm is adding 55,000 sq ft for production of cold drawn bars.

General Electric Co., Phoenix, Ariz. A $2 million addition is earmarked for the growing Computer Dept.

Up Portland Way—In Portland, Ore., doors are opening for these firms: Custom Bumper Manufacturing Co., custom bumpers; Leflar Enterprises, recreation equipment; Wagner Mining Scoop Co., mechanical handling equipment.

Aeroquip Corp. will enlarge its Burbank, Calif., plant for flexible hose and couplings. Parker Seal Co., Culver City, Calif., will soon have 20,000 sq ft more for rubber and metal products production.

Research Spending — Nortronics Div. of Northrop Corp., Hawthorne, Calif. A $4 million layout goes for a new engineering research, development, and pilot production facility. And nearby, Servomechanisms, Inc., is pushing along a 48,000 sq ft addition for design and manufacture of electromechanical sub-systems and components for the aircraft and missile industry.

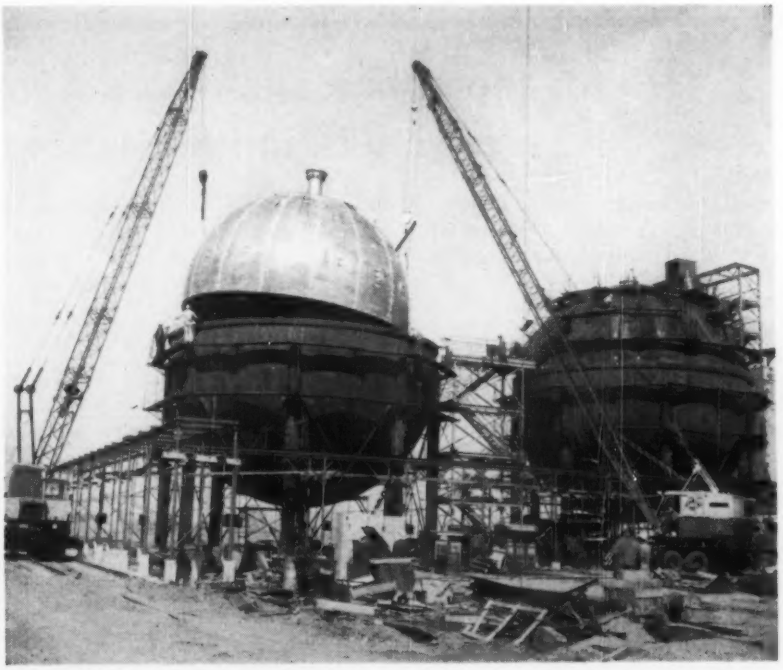
Work in 49th State — Up in Alaska, near Fairbanks, government engineers plan a $60 million construction project. It's for building the Clear Air Force Station.

Marquardt Aircraft Co., Van Nuys, Calif., has more space for production of ramjet engines and related controls and accessories. Exitaire Co., Pacoima, Calif., is in a new plant, making exhaust fans for roof mounting.

Unitek Corp., Monrovia, Calif., has a new plant going up to produce precision spotwelders. Clark-Wheeler Engineering, Inc., Paramount, Calif., a new company, will make seamless metal tubing.

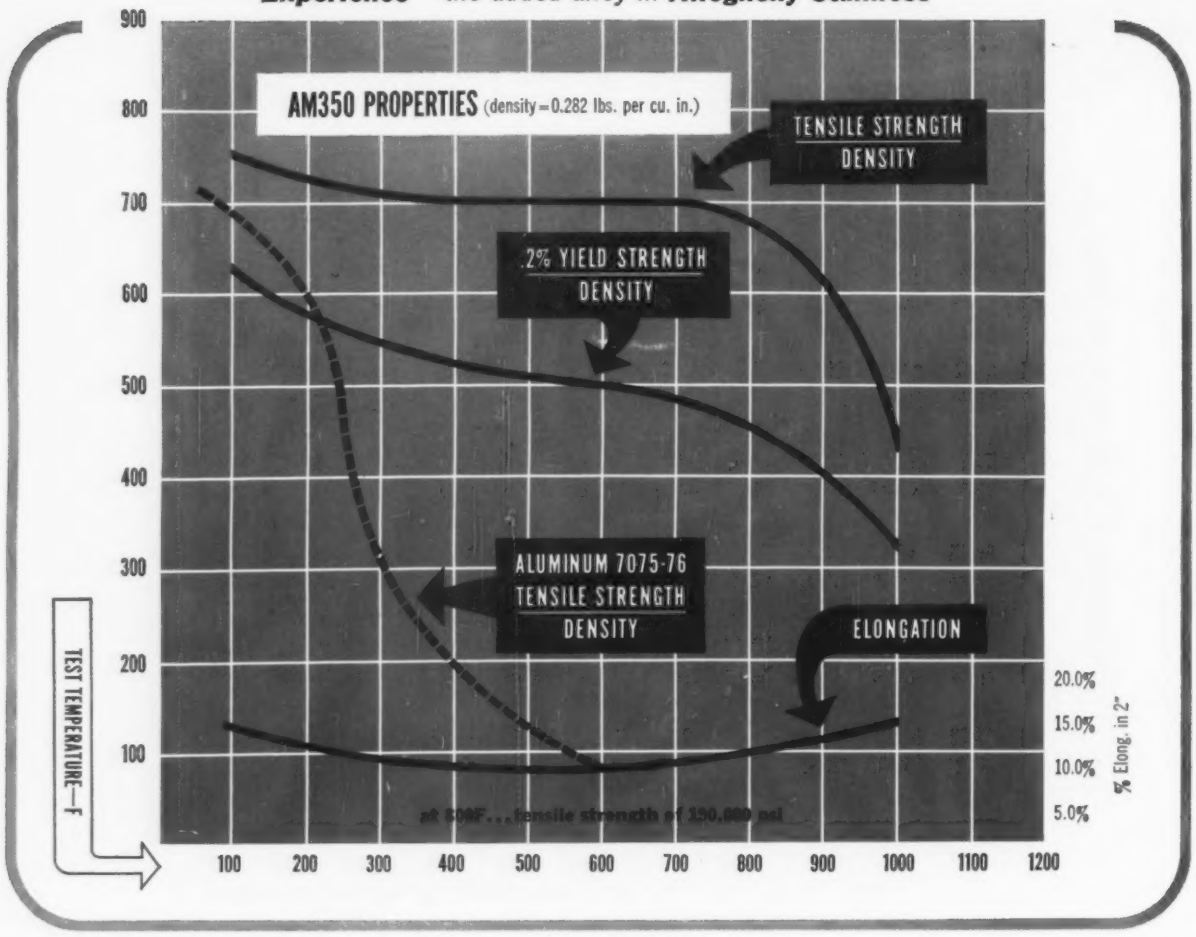
And in Arizona—Phoenix, Ariz., got the nod for Cannon Electric Co.'s big new plant. The Los Angeles manufacturer of electronic and electrical plugs plans a 100,000-sq-ft plant on a 10 acre site. Cannon expects first-year employment will reach 700. Eventually 1000 may be hired.

Like Putting an Egg Back Together



SHELL FOR NITROGEN: Cranes move upper half of shell for 25 million cu ft liquid nitrogen storage tank into place. Installation is at new oxygen-nitrogen plant of Linde Co., Div. of Union Carbide Corp., Pittsburg, Calif. First operation is scheduled before July 1.

Experience *— the added alloy in* ***Allegheny Stainless***



Two for the space age—AL's AM-350 and AM-355 precipitation hardening steels

A unique combination of highly desirable properties describes Allegheny Stainless AM-350 and AM-355 Steels. They combine high strength at both room and elevated temperatures, excellent corrosion resistance, ease of fabrication, low temperature heat treatment, good resistance to stress corrosion.

They are proving the answer to many space age problems. Airframe and other structural parts, pressure tanks, power plant components, high pressure ducting, etc. are all natural missile and supersonic aircraft applications for AM-350 and AM-355.

AVAILABILITY: AM-350, introduced several years ago, is available commercially in sheet, strip, foil, small bars and wire. AM-355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars and wire.

CORROSION RESISTANCE: Compared to the more familiar stainless grades, AM-350 and AM-355 resist corrosion and oxidation better than the hardenable grades (chromium martensitic) and only slightly less than the 18 and 8's. They resist stress corrosion at much higher strength levels than do martensitic stainless grades.

SIMPLE HEAT TREATMENT: High strength is developed by two methods. Both minimize oxidation and distortion problems. The usual is the Allegheny Ludlum-developed sub-zero cooling and tempering (SCT): minus 100F for 3 hrs plus 3 hrs at 850F. Alternate method is Double Aged (DA): 2 hrs at 1375F plus 2 hrs at 850F.

EASY FABRICATION: AM-350 and AM-355 can be spun, drawn, formed, machined and welded using normal stainless procedures. In the hardened conditions, some forming may be done . . . 180 degree bend over a 3T radius pin. Also AM-350 can be dimpled in the SCT condition to insure accurate fit-up.

For further information, see your A-L sales engineer or write for the booklet "Engineering Properties, AM-350 and AM-355." ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. A-161.***

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AL

Tool Builders Fight for Life

Effective Weapon of Foreign Makers Is Price

NMTBA head says some U. S. buyers are on strike against the high cost of U. S. tools.

And he presents other reasons the U. S. tool industry may wind up playing second fiddle. — By E. J. Egan, Jr.

▪ The U. S. machine tool industry —world leader for as long as anyone can remember—is fighting for its very life.

Some say it will recover from the recent recession and become stronger than ever. This may not come true. This time the industry is in big trouble.

Offhand remarks about past depressions and the cyclical nature of the business only smokescreen the real problem: The industry is pricing itself out of the market.

The authority for this considered view is levelheaded, straight-talking Ralph J. Kraut, president of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and current president of the National Machine Tool Builders' Assn.

Buyers Revolt—Speaking to the nation's leading machine tool designers and many major equipment buyers at the 23rd Westinghouse Machine Tool Forum in Buffalo last week, Mr. Kraut bluntly admitted: "To a certain extent, U. S. buyers are on a strike against our high priced products."

Choosing his words with deliberate care, he warned: "Very soon the U. S. will no longer be the world's leading manufacturer."

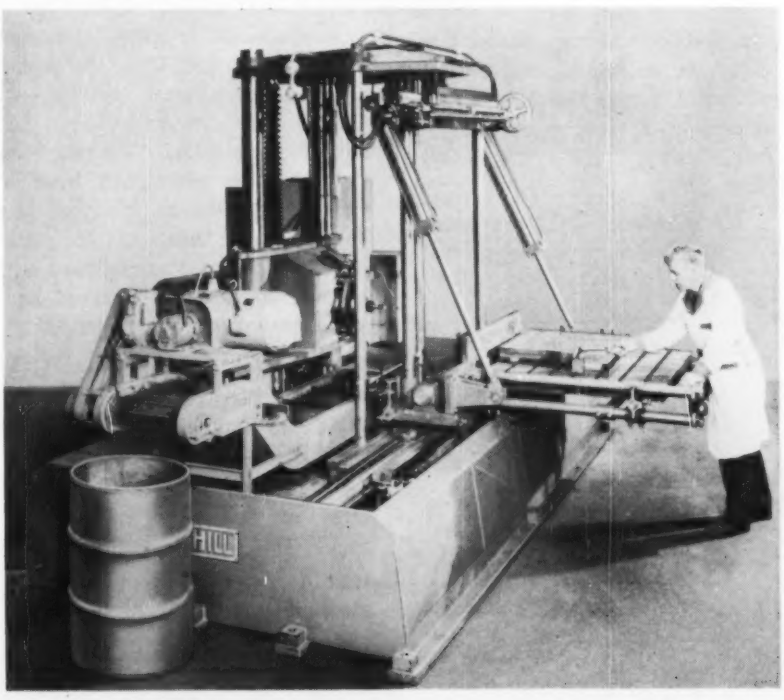
Raised eyebrows in the audience quickly knitted into frowns of concern as he ticked off his reasons.

Wage Disadvantage — Foreign wage rates are only one-fourth to one-fifth as high as ours, and foreign labor works harder and longer hours, he explained. "We're at a disadvantage not only because of the higher wages we pay, but also because wages and fringe benefits have increased at a rate twice as fast as output per manhour in the past 10 years."

Mr. Kraut, who probably spends more time in Europe than any U. S. builder executive, said there are "1500 builders in West Europe compared to an estimated 300 to 500 in the U. S." Great Britain and West Germany each produced a greater physical volume of machine tools than the U. S. in 1958, he declared. He didn't have to remind his audience that a growing flood of these tools is starting to swamp U. S. builders here at home.

Three Point Plan—To keep U. S. industry strong and avoid wrecking our defense potential, Mr. Kraut recommends: (1) A strong public demand to halt the inflationary spiral, (2) resolute action along this line by both business and labor, (3) more statesmanship and less politics in establishing sound fiscal policies for the nation.

O.K. to Tilt This Machine



CLOSE CONTROL: Tilting table on this tape controlled Hill machine simplifies loading of single or stacked parts for precision machining.

INDUSTRIAL BRIEFS

Contracts Awarded — National Steel Corp., awarded contracts for facilities in its new $300 million expansion program. The contract for an 80″ continuous hot strip mill at Great Lakes Steel, Detroit, has been awarded to United Engr. & Foundry Co. Mesta Machine Co. will construct a new 45″ continuous annealing line at Weirton Steel Co., Weirton, W. Va.

Stainless Newcomers—Two new stainless steels are now available from Universal-Cyclops Steel Corp., Bridgeville, Pa. One is a low, low cobalt stainless used for containers and internal structural members in atomic reactors. The other is a high boron stainless for reactor shielding and control rods.

Adding to the Melt—A specially mounted ladle additions feeder for feeding ferromanganese into the ladle during tapping of a tilting openhearth furnace has been designed by Blaw-Knox Co., Pittsburgh, for the National Tube Div. of U. S. Steel Corp.

Lab Men at Work—A spectrochemical applications laboratory for work on analytical problems in chemicals, metals and related technologies has been opened by Baird-Atomic, Inc., Cambridge, Mass.

"Yes, we have an incentive plan. Work hard and you won't be fired."

On to New Stanton—A $4 million contract for a plant and office building at New Stanton, Pa., has been awarded to The Rust Engineering Co., Pittsburgh, by Robertshaw-Fulton Controls Co. New plant will replace present facilities at Youngwood, and Scottdale, Pa., of the company's Robertshaw Thermostat Division.

Dow Regroups Mag Sales—The Dow Chemical Co., has reorganized its magnesium sales organization into two separate groups. It will be divided between a Metal Sales Dept., specializing in sales of primary metal, alloy ingot, and cast anodes; and a Magnesium Products Sales Dept., concentrating on the sale of sheet, extrusions, sand and die castings, and fabricated products.

Two Form a Third—The Electric Storage Battery Co., Philadelphia, and Reeves Brothers, Inc., New York, have formed a jointly owned corporation known as the ESB-Reeves Corp., located in Delaware. New corporation will develop porous and microporous plastic materials suitable for wearing apparel and other end uses.

Maple Leaf Oxygen—Dominion Foundries & Steel Ltd., Hamilton, Ont., Canada, has ordered an Oxyton plant, valued at about $2 million, from Air Liquide, of Canada. New plant will have a capacity of 150 tons of oxygen per day. It is the third oxyton plant that Defasco has commissioned Air Liquide to design, construct and install within a five-year period.

Destination Oklahoma—A $1½ million order for six GMW gas engine compressors has been awarded to The Cooper-Bessemer Corp., Mount Vernon, O., by the Dept. of the Interior's Bureau of Mines. The compressors are planned for the newest helium recovery plant at Keyes, Okla.

Kudos for Luria—An award for outstanding advertising was made to Luria Brothers & Co., Inc., Philadelphia, by the Lithographers and Printers National Assn. Luria received national recognition in the text book classification.

The IRON AGE in Pittsburgh—The Pittsburgh editorial and business office of The IRON AGE has moved to 1707 Frick Annex Building, 429 Forbes Ave., Pittsburgh 19, Pa. The phone number remains Atlantic 1-1830.

Sales Target—Detroit Harvester Co., has acquired the Weaver Mfg. Co., Springfield, Ill., to broaden the company's output to include automotive service equipment. Move was made in anticipation of a significant expansion of the automotive service market during the next 10 years.

Meet Abbey 100—Abbey Plastics Corp., Hudson, Mass., has developed an electrically conductive polyvinyl chloride compound. The material described as a "semi-conductor," is designated as Abbey 100. It is commercially available for extrusion, calendering and injection molding.

Controls for Nuclear Carrier—A $1.5 million contract for the manufacture of control rod drive mechanisms for the U. S. Navy's atomic powered aircraft carrier has been awarded Royal Industries, Inc., Los Angeles. The contract awarded by Westinghouse Electric Corp., will be performed by Vard, Inc., a Royal subsidiary.

Chilean Containers — Rheem Mfg. Co. will form an affiliated company in Chili in which it will be the managing partner. The new company, Rheem Chilena S. A., is scheduled to start making steel shipping containers by July 1. It will produce 55-gallon drums and smaller containers in a $½ million plant located at Maipu, near Santiago. The plant will use 5000 tons of Chilean steel annually.

Westinghouse Supply Depot — Westinghouse Electric Corp. will build a new warehouse at Columbus, O. It will function as a supply depot and inventory service center for Westinghouse products.

Site-seeking industry take note: Here is a choice location which merits your immediate investigation—the Memphis Harbor and Industrial Area. This photo shows only a portion of the 960-acre development where 39 industries have already moved in. Acreage in the Memphis Harbor and Industrial Area is readily available and offers properties with or without water frontage.

This planned industrial development is only ten minutes from downtown Memphis. Memphis' strategic location, on the mighty Mississippi and at the hub of Mid-South rail and truck activity, provides ready access to the major markets of the nation. A new public $1,400,000 River-Rail-Truck-Terminal on the stillwater harbor is at your service. Direct freight connections can be made to eight major trunk line railroads, five scheduled service barge lines, 91 motor freight lines and eight commercial air lines.

Memphis has a lower combined cost of electricity, natural gas, water, taxes and insurance than any comparable city in the nation. There are a multitude of other reasons, too. For the full story clip and mail the coupon today.

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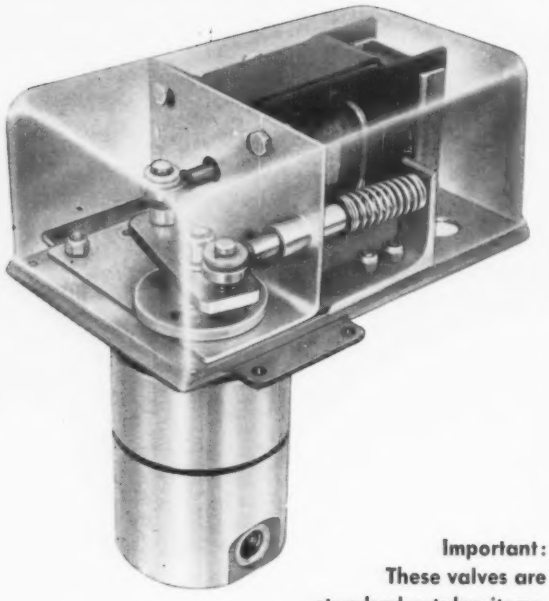
10,000 P.S.I. SOLENOID VALVES



Important:
These valves are standard catalog items.

● They are available for immediate delivery (in stock) at standard valve prices, for a service which generally requires costly (made-to-order) special valves.

● Shut off and 4-way valves in ¼, ⅜ and ½ inch port sizes are rated for 10,000 P.S.I. liquid or gases. They will withstand surges of up to 15,000 P.S.I. without damage to the valves' sealing qualities (designed for a burst pressure of 30,000 P.S.I.).
Solenoids are available for 115, 230 and 460 volt A.C. operation.

● Long maintenance-free service is achieved through the leak-proof "Shear-Seal" design. Optically flat metal to metal sealing surfaces (of the self-aligning sealing rings and the mating rotor face) are protected by staying in constant intimate contact: flow is always through the center of the "Shear-Seals," never across sealing surfaces. Sealing qualities actually improve as the seals lap themselves to a more perfect fit with each valve operation. There is no external shaft leakage because the pressure is confined to the flow passages.

For complete data write for catalog S-10000.

CONTROL VALVE DIVISION
barksdale valves
5125 ALCOA AVENUE • LOS ANGELES 58 • CALIFORNIA

AIR VALVE

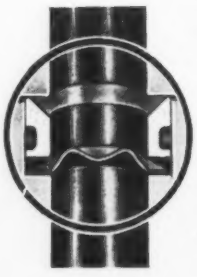
FOR ORIGINAL EQUIPMENT MANUFACTURERS

250 P. S. I. four-way air valves in ¼, ⅜ and ½ inch pipe sizes.

This is a re-design of our proven 250 P. S. I. air valve.

NEW FACE LIFT results in LOWER PRICE

None of the operating advantages of this rugged *'Shear-Seal'* valve has been reduced one iota!



. . . same non-corrosive construction throughout — eliminates failures due to rust.

. . . same long wearing leak-proof qualities — metal to metal *'Shear-Seal'* design is not sensitive to dirt, compensates for wear.

. . . same installation savings — because no oilers or filters are needed.

Only the exterior has been modified — tailored to the special preference of the Original Equipment Manufacturers — and, as a result, costs and prices have been substantially reduced.

Write for bulletin 5000 which includes design specs.

CONTROL VALVE DIVISION
barksdale valves
5125 ALCOA AVENUE • LOS ANGELES 58 • CALIFORNIA

C. R. Derhammer, elected president, **The Lakeside Steel Improvement Co.,** Cleveland.

L. D. Fykse, appointed director, marketing, **Associated Spring Corp.,** Bristol, Conn.

C. C. Earle, appointed sales manager and **R. H. Marta,** appointed manager, General Order Dept., Philadelphia plant, **Joseph T. Ryerson & Son, Inc.**

J. S. Peebles, appointed superintendent, industrial relations, **Republic Steel Corp.'s Berger Div.** in Canton, O.

R. R. Haug, appointed a salesman, Cleveland district sales office, **Allegheny Ludlum Steel Corp.,** Pittsburgh.

John Fuqua, appointed chief plant metallurgist, **Cooper Alloy Corp.,** Hillside, N. J.

F. M. Zeder, II, elected president and chief executive officer, **Hydrometals, Inc.**

W. S. Loose, named manager, Metal Sales Dept., and **D. H. Gilmore,** will head the Magnesium Products Sales Dept. of **The Dow Chemical Co.**

R. J. Prochaska, appointed advance development specialist, **General Electric Co.'s** Chemical Materials Dept., polycarbonate engineering section at Pittsfield, Mass.

M. C. Musser, promoted to supervisor, personnel relations, **Wire Rope Div.** of **Jones & Laughlin Steel Corp.,** Muncy, Pa.

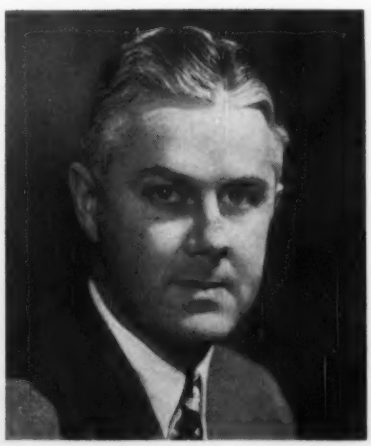
W. W. Durand, named chief metallurgist, **Crucible Steel Co.'s** Park Works in Pittsburgh.

H. G. Vilsoet, named district manager, **Republic Steel Corp.'s Berger Div.** sales organization in Buffalo, N. Y.

R. W. Deuster, appointed European nuclear sales representative, **The Babcock & Wilcox Co.** with headquarters in Brussels, Belgium.

John Capelia, appointed controller, **Exide Industrial Div., The Electric Storage Battery Co.,** Philadelphia.

B. H. Wildenhaus, appointed manager, distributor sales, **Simonds Worden White Co.,** Dayton, O.



A. L. Rowe, appointed vice president and secretary, **La Salle Steel Co.,** Hammond, Ind.

J. H. Ries, appointed executive vice president-treasurer, **The Lakeside Steel Improvement Co.,** Cleveland.

C. W. George, appointed manager, engineering, **General Electric Co.'s** Gas Turbine Dept., Schenectady, N. Y.

Dr. R. H. Valentine, became director, research and development, **New Departure Div.** of **General Motors Corp.**

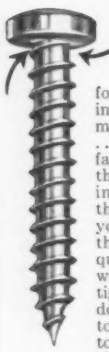
The following promotions are within the Sales and Contracts Dept. of **AC Spark Plug Div.** of **General Motors Corp. A. B. Goodspeed,** becomes asst. director, sales and

(Continued on P. 92)

Galen Miller, elected executive vice president, **Towmotor Corp.,** Cleveland.

HOW

to know you're getting the quality you want



Look here

for full top threads, so important on sheet metal tapping screws . . . and the shorter the fastener or the thinner the material, the more important full top threads become to your profit. Without that extra mark of quality, the fasteners will spin instead of tighten, cost you extra dollars out of profit to replace them. Full top threads are consistently *built* into American fasteners.

Look here for sharp points that pierce cleanly and help each fastener drive straight and true. Sharp points, like full top threads contribute to your profit picture because they eliminate the extra costs of replacing poor materials. Sharp points are another mark of *consistent* quality you get with American.

Write today for samples of this American quality and a free stock list.

Look here

Profit Improvement Program

Quality fasteners cost more to produce . . . improve your profits when used!

Buy here

American SCREW COMPANY

Willimantic, Conn. • Detroit, Mich. • Chicago, Ill.

(Continued from P. 91)

contracts; **W. B. French,** becomes manager, defense sales products; **W. B. Thompson,** becomes contract administrator.

R. V. Hansen, named marketing manager, vending machine controls, **Controls Co. of America,** Schiller Park, Ill.

E. B. Shaw, appointed vice president, sales, **Coating Div., Dacar Chemical Products Co.,** Pittsburgh.

H. P. Binder, appointed consultant, and **H. L. Ross,** manager, West Allis Pump Dept. of the **General Products Div.** of **Allis-Chalmers Mfg. Co.**

W. M. Connor, promoted to general manager, Statesboro, Ga., plant, **Rockwell Mfg. Co.; S. W. Brown,** named asst. general manager, Uniontown, Pa., plant.

E. P. Berg, appointed general manager, Chicago operations, **Link-Belt Co.**

W. H. McGlade, named product development manager, earthmoving and related equipment, **Le Tourneau-Westinghouse Co.,** Peoria, Ill.

L. A. Colbath, named district manager, Georgia, South Carolina and Florida, **Edward Valves, Inc.,** a subsidiary of **Rockwell Mfg. Co.**

W. B. Taylor, named chief accounting officer, **Johnston & Funk Metallurgical Corp.,** Wooster, O.

F. A. Meunier, named senior engineer, Electronic Engineering Dept., **Magnaflux Corp.,** Chicago.

S. H. Steffey, appointed manager, slag products section, **U. S. Steel Corp.**

J. W. Stertzer, appointed sales engineer, **Pump and Controls Div., Denison Engineering Div.,** American Brake Shoe Co., Columbus, O.

Frank Zega, appointed field sales engineer, Kentucky and Western

(Continued on P. 96)

OUR experienced engineers are available to make practical suggestions on the efficient operation and maintenance of your equipment.

Our simple daily cost record determines the most efficient type of abrasives for you to use, and equally important, proves the kind of economies Cleveland Metal Abrasive can offer.

Many customers are already using the Cleveland cost system. Write us today for more information, together with new catalog No. 159, or call our nearest representative.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

1. Realsteel Shot and Grit	2. Pearlitic Malleable	3. Normalized	
4. "A" Iron	5. Hi-Strength "B"	6. Chilled Iron	7. Cut Wire

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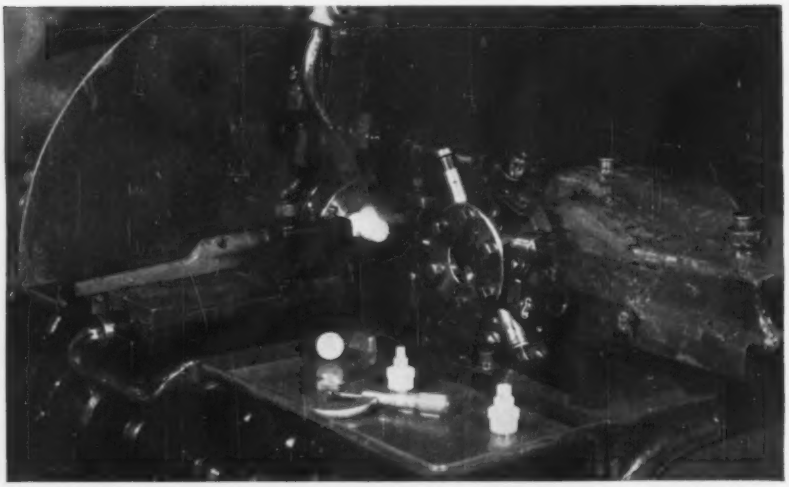
the CLEVELAND metal abrasive company

GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio • PLANTS AT Howell, Michigan; Toledo; Cleveland

World's Largest Production Capacity

Lubrication



SPECIALLY TRAINED OPERATORS now machine "Teflon" to tolerances of .001" with Texaco Cleartex BX.

ANSWER TO "TEFLON" MACHINING PROBLEM FOUND BY THROWING OUT STANDARD CUTTING TECHNIQUES

DuPont's new thermoplastic, "Teflon" (or, more precisely, Polytetrafluoroethylene resin) has a combination of properties which makes it uniquely advantageous in a number of applications.

They also make it uniquely difficult to machine.

Unlike other thermoplastics, "Teflon" does not flow well in its melted state. This, plus the fact that the molding process requires extremely high temperatures, makes molding to close tolerances difficult. "Teflon" must be machined from rod stock when tolerance is a critical factor.

Special machining problems. Standard cutting techniques cannot be applied to "Teflon" machining, according to Mr. S. Mulay, President of Tri-Point Plastics, Inc., Albertson, N. Y. His firm, which specializes in working DuPont's new product, had to invent new cutting techniques and retrain operators to cope with "Teflon's" special characteristics. In spite of these steps, the materials—tools and lubricants—used in the machining process still gave Tri-Point trouble.

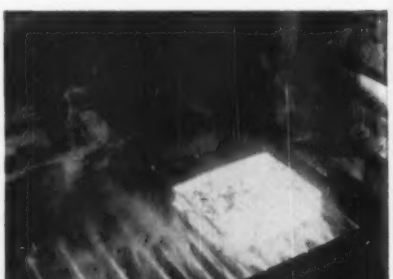
Cutting oil a critical factor. It soon became obvious that standard cutting oils used for ordinary metalworking were not adequate for "Teflon" machining. Although "Teflon" is not an abrasive material, its very low thermal conductivity coupled with its high heat resistance tended to shorten tool life by actually burning cutting edges. These high temperatures also warped the machined part, making close tolerances almost impossible. Finally, "Teflon's" white color made it extremely difficult to see the work through soluble oil emulsions—which otherwise might have solved the problem.

Tri-Point calls in Texaco. At this stage Tri-Point turned to the expert – a Texaco Lubrication Engineer. He outlined the need: a transparent cutting oil with the ability to remove the maximum amount of heat. After considerable study and testing, he recommended switching to Cleartex BX whose characteristics seemed precisely to fit the situation. His choice has proved to be right. Now Tri-Point uses this oil exclusively, with excellent results. Tool replacement has dropped significantly, and Tri-Point can count on maintaining "Teflon" tolerances of .001".

Pressure plus heat presents two-way lubrication problem

There is a definitely established trend today toward higher and higher temperatures in industrial processes in almost every type of industry. Mill rolls, plastic extruding machines and steam joints are only a few of the many applications which now involve temperatures well over 300° F. combined with high pressures. This combination has presented a severe lubrication problem – particularly in grease-lubricated equipment.

Nature of grease creates problem. As temperature rises, the consistency of grease decreases – most greases become virtually useless at temperatures above 350°. Furthermore, high heat will usually cause rapid oxidation and deterioration in a relatively short time.

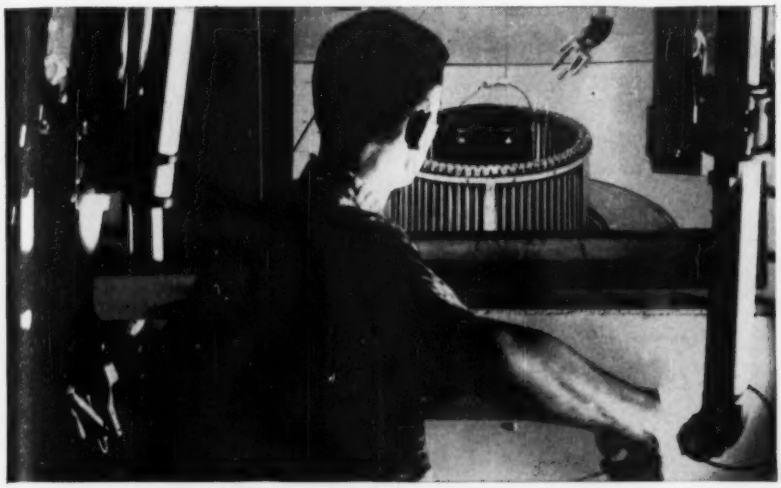


Unique new grease resists both forces. Texaco has now developed a new product whose remarkable performance in two years of field tests seems to answer the problems of *both* high heat *and* extreme pressure—Thermatex EP-1.

Thermatex is unique in its high resistance to both these forces.

Protects 400° equipment for two years. Thermatex has been field-tested for two years as the lubricant for steam joints in a paper mill. Previous products used had solidified and coked after two weeks of exposure to the extreme pressures and 400° F. heat, causing failure of the joint. Thermatex, on the other hand, has kept the steam joints operating without failures—and without significant wear—for two years.

news



GAMMA-RAY "HOT CELL" AT BEACON contains radioactive Cobalt-60.

Nuclear energy harnessed to crack the secret of better lubricants

Lubricants finer than the ones available from even the most advanced standard refining techniques will soon be produced by Texaco—with the help of nuclear radiation. Completely *new* lubricants are a real possibility, too—lubricants with atomic structures stronger and more cohesive than anything now available.

To open up this new frontier in lubrication, Texaco has assembled the most fully equipped nuclear laboratory in American industry. Texaco scientists have been put in command of all four basic irradiation forces—electrons, positive ions, gamma rays and neutrons—and are now probing the activity of hydrocarbon molecules during refining.

In addition to the Cobalt-60—rated at 29,000 curies—Texaco scientists have at their disposal a 6- to 10-million electron volt linear accelerator and a 3-million electron volt positive-ion Van de Graaff generator. The linear accelerator, or "electron gun," was especially designed and built for Texaco and is probably the only nuclear instrument of its kind now in use by a commercial firm for its own fundamental research.

Searching analysis of deposit problems

The January 1959 issue of *Lubrication Magazine* is entirely devoted to deposit problems—their causes, prevention and solutions. This article should be of vital concern to every engineer who has to cope with this often-costly lubrication problem. See coupon.

MOVIE OF THE MONTH

★★ SEE! ★★

"HYDRAULICS"

"One of the year's most informative movies!"

—Paul Rolnick, Editor, *Applied Hydraulics*

NEW PRODUCT NEWS

Nondrying protective coating keeps parts free from rust and corrosion for as long as a month during inter-process handling, storage, and shipment: *Texaco 564 Rustproof Oil.*

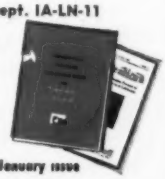
New, easy-to-apply gear lubricants won't drip in hot weather or flake off in cold—are ideal for many open-gear applications: *Texaco Geartac.*

How working splits grease fibers.

80,000x electron microscope explores grease structures

One of the most important tools of research, the electron microscope, is helping in the development of new and better greases. By understanding the nature of grease structures and their reaction to various conditions, Texaco scientists can create greases that are suitable for many different purposes.

THE TEXAS COMPANY, Dept. IA-LN-11
135 East 42nd Street
New York 17, New York



Dear Sirs:

☐ I am interested in seeing "HYDRAULICS"

I would like a free copy of

☐ Lubrication Magazine – January issue

☐ Management Practices that Control Costs via Organized Lubrication

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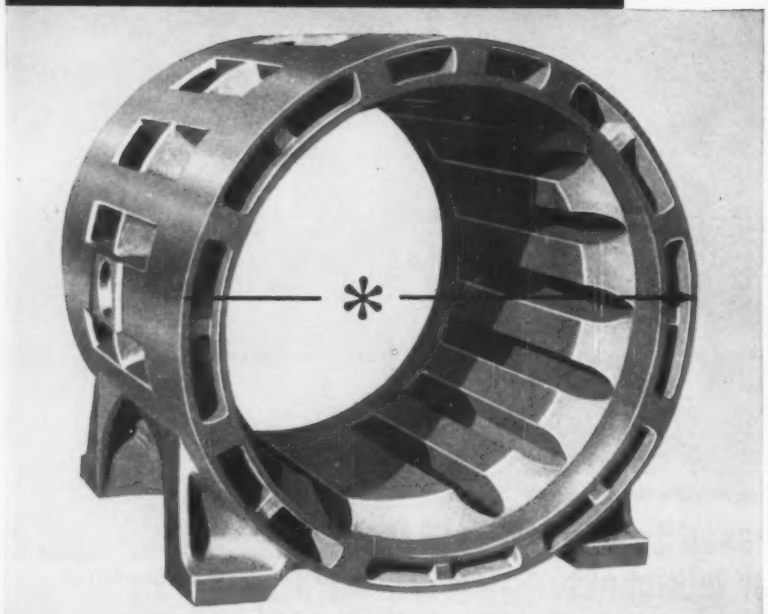
URICK'S DUCTILE IRON



Courtesy RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, O.

MOTORS . . . . from the Lakes to the Sea

This 1300-pound URICK casting (a fan cooled motor stator frame made to Navy specifications) will withstand extra stress and strain and has better corrosion resistance because it is Ductile Iron. URICK recommends and successfully casts Ductile whenever greater tensile strength and higher impact value are of prime consideration because it has most of the advantages of steel, yet because of its high molten fluidity, it will take intricate shapes not possible with other high strength metals. Other advantages are—Ductile castability permits weight reduction while maintaining required physical properties . . . superior machinability reduces machining time and consequently results in longer tool life. There are other advantages and economies to Ductile when recommended, engineered, and cast by URICK, ask about them.

**This fan cooled motor stator frame to US NAVY specifications is cast in 16 different sizes from 16" to 42".*

Send for Bulletin on URICK's Ductile . . . ask for catalog on URITE gray iron and URICK's facilities, too! Remember, URICK starts with 'U.'

URICK FOUNDRY

ERIE, PENNSYLVANIA

LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY., INC.

(Continued from P. 92)

Tennessee, **Air Impeller Div.** of **The Torrington Mfg. Co.,** Torrington, Conn.

A. H. Barrows, appointed manager, sales, Cleveland district, **U. S. Steel Corp.**

S. A. McFarland, Jr., appointed manager, sales, Indianapolis, **U. S. Steel Corp.**

OBITUARIES

George Bissett, 72, president, **Bissett Steel Co.**

C. D. Dalls, 77, former board chairman, **Revere Copper & Brass Inc.**

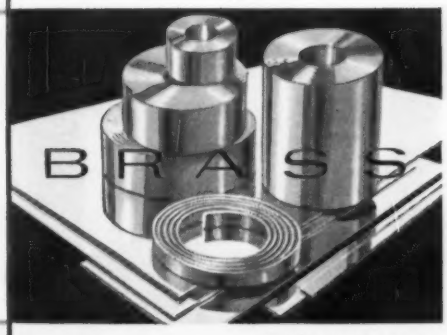
R. M. Baker, superintendent, Openhearth Dept., Sparrows Point, Md., steel plant, of **Bethlehem Steel Co.**

C. B. Johnson, 55, head purchasing agent, Milwaukee facilities, **Chain Belt Co.**

J. J. Morsman, Sr., a retired director, **National Lead Co.**

When you think
of product development
think of brass...
especially Western Brass...
it's "tailor-made" for each job.

Western
*



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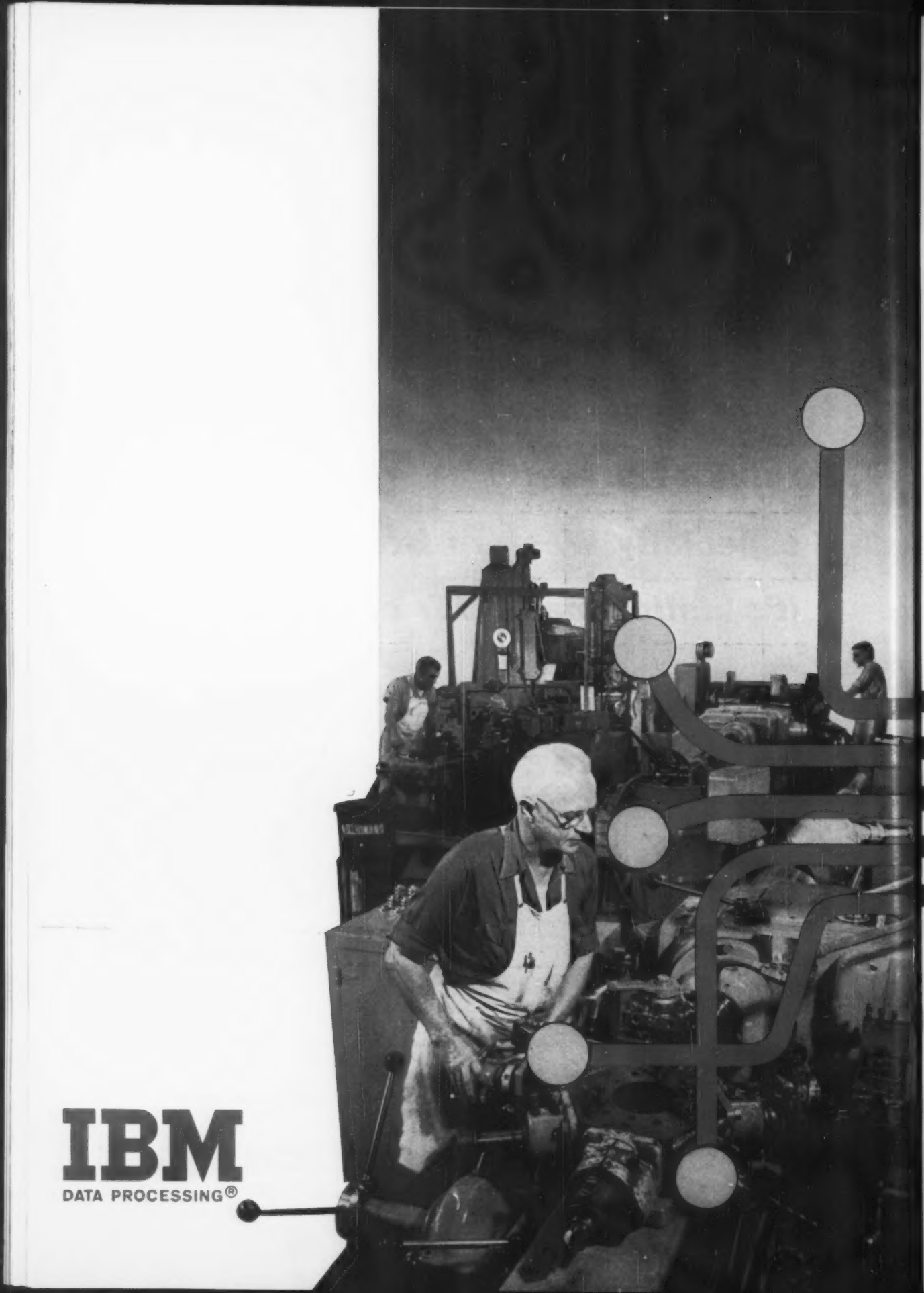

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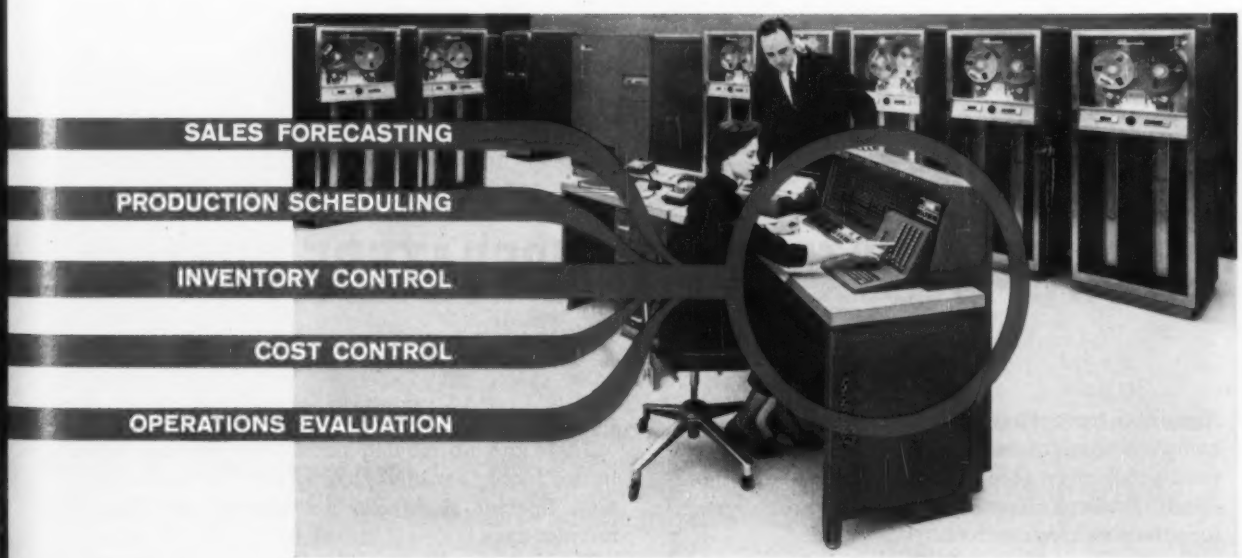

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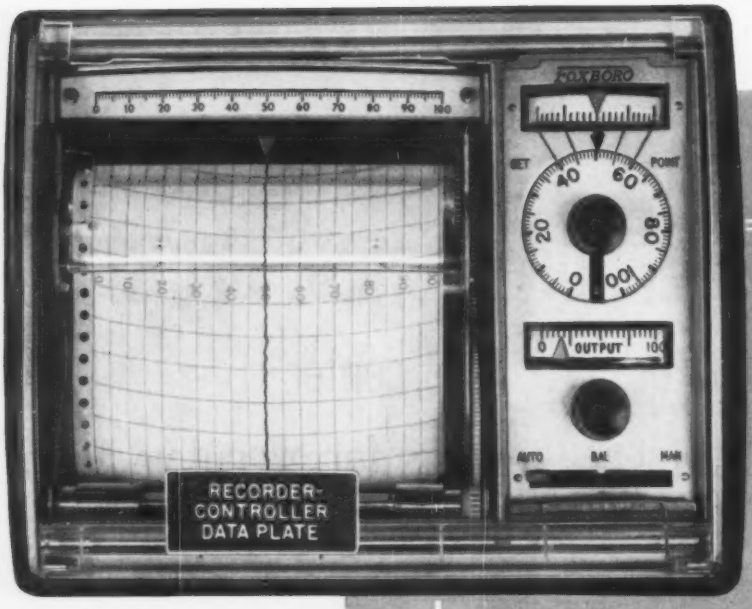

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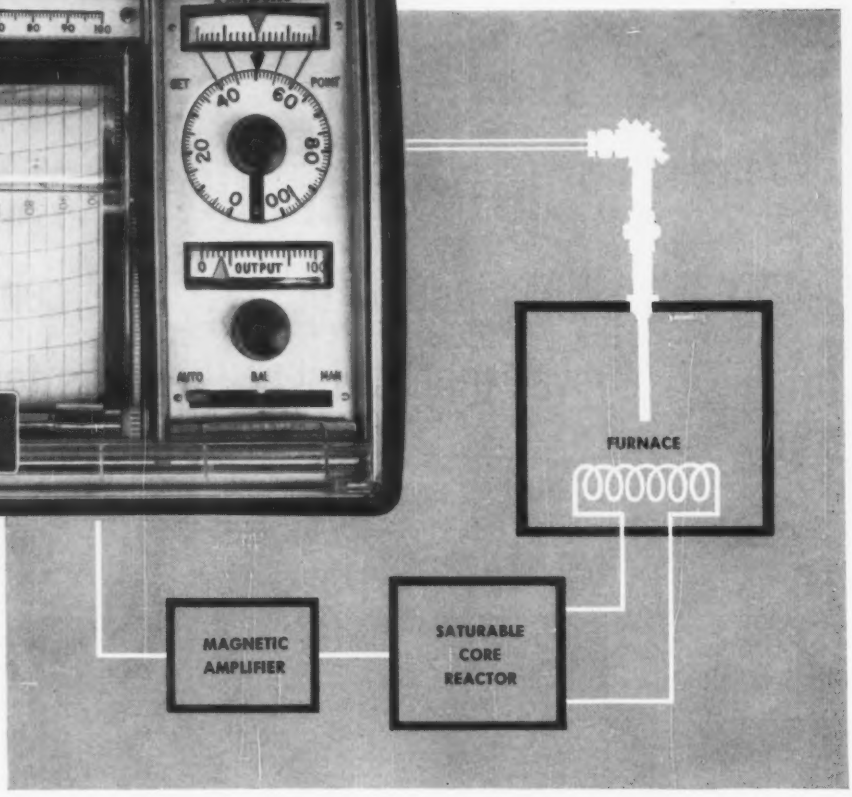

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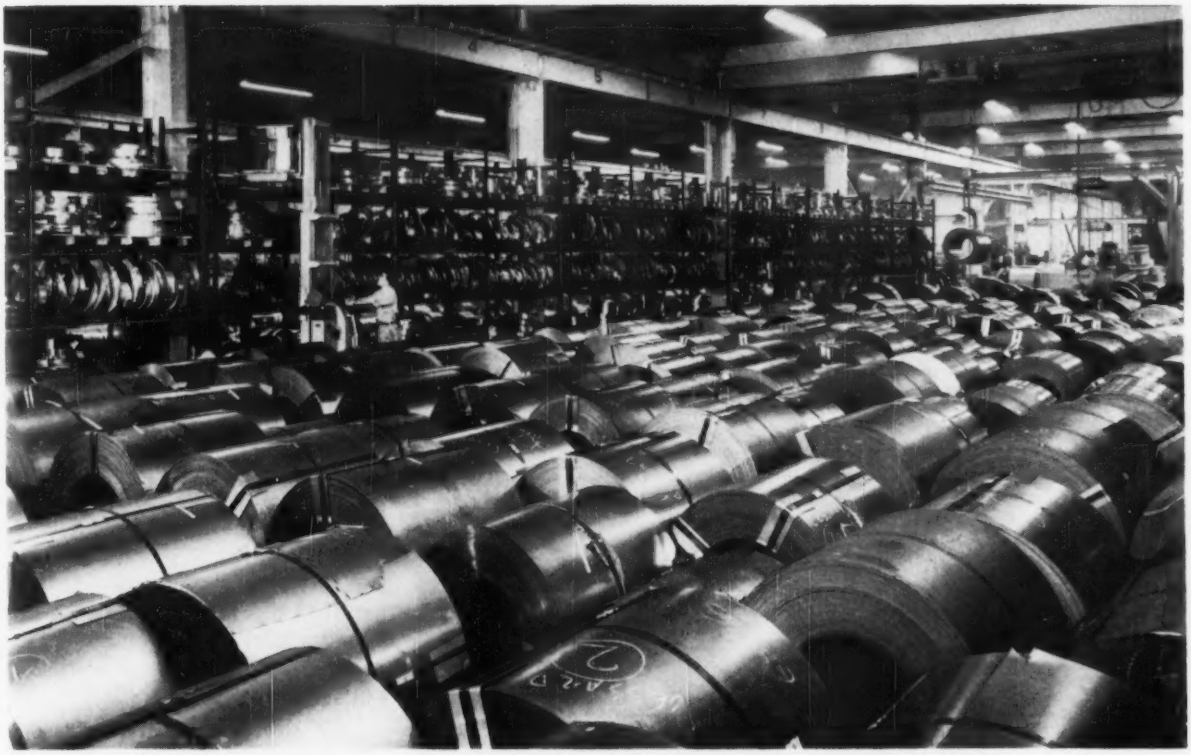
ELECTRONIC CONSOTROL INSTRUMENTATION



IN IT COMES: By processing bulk purchases of heavy steel coils, warehouses perform a useful service.

Steel Warehouses Mechanize To Serve Customers Better

By doing more metal processing, steel warehouses are saving money for customers and grabbing a bigger piece of the steel sales pie for themselves.

■ In mechanization and methods, many steel warehouses are becoming as modern as any of the plants they serve. They're coming to be known as "steel service centers"—true production facilities that are as much concerned with processing metals as with storage.

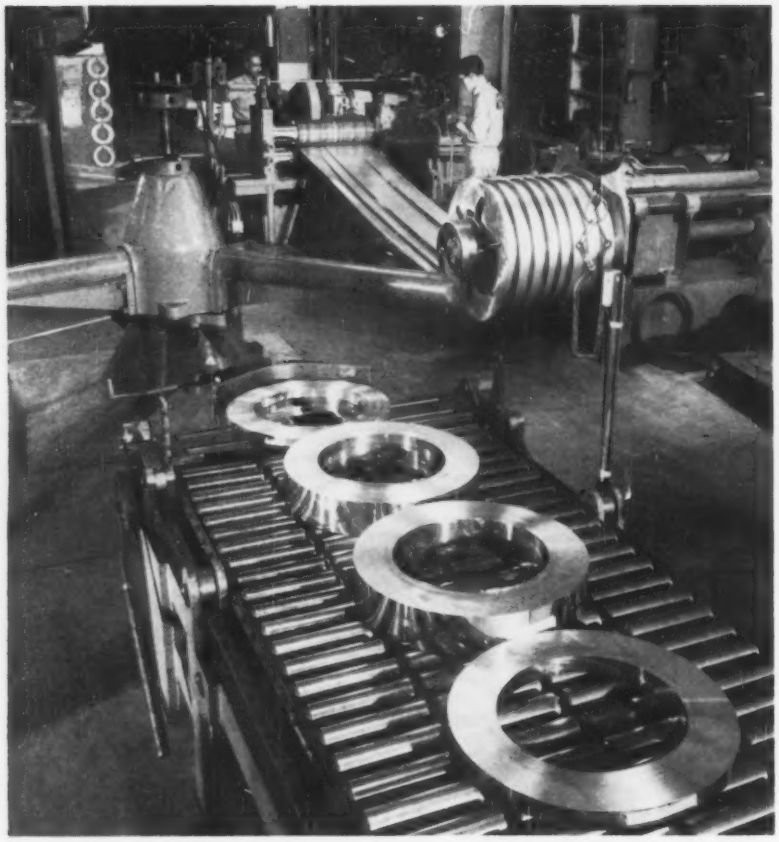
As a result, warehouses are selling more steel. Last year they accounted for 20 pct of all the steel bought in the U. S. And as cost advantages induce more steel users —even the largest ones—to buy from warehouses, the figure could well go to 25 or 30 pct in the next few years.

Showcase Plant — The newly completed plant of Precision Steel Warehouse, Inc., Franklin Park, Ill., exemplifies this industry trend toward more processing as a customer service.

With its techniques for mass production, automatic handling, integrated data processing, and inventory forecasting, Precision's new plant represents a complete flight from the concept of "storage barn" warehousing. More than 80 pct of its orders involve metal processing. And it's significant that despite the 1958 recession, the company's sales volume went up.

INVENTORIES: For an up-to-date report on steel warehouse stocks see Special Report, p. 63.

Equipment is Key—The success of any processing warehouse depends, of course, on the variety and quality of its machinery. Precision's plant is fully equipped to provide



NO HANDS TOUCH IT: Precision Steel's 36-in. slitter line features automatic handling throughout to save manpower and guard strip finish.

all the services its customers may require.

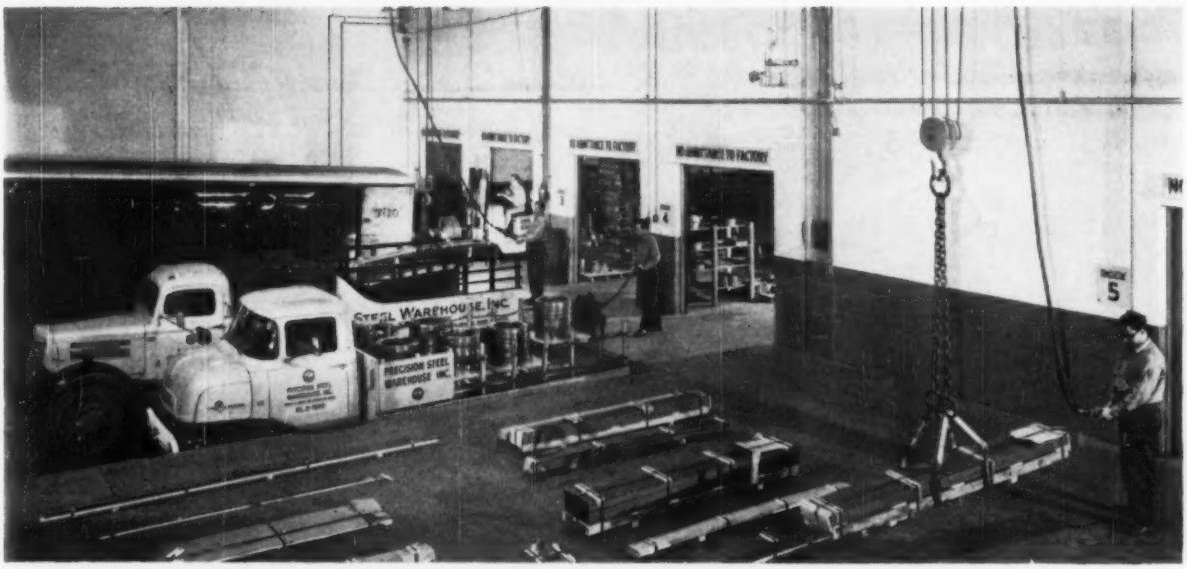
Its heavy shears, for example, are fitted out with automatic work handling and stacking devices. Its roller leveler lines, with electric eye controls, have flattening, shearing, and stacking stations. Special edge rolling and edge filing machines are other examples of the quality equipment on hand.

Handling is Automatic—One of the biggest factors in efficient processing is automatic handling of materials. Precision Steel's slitting lines, for example, are fully conveyorized; from start to finish, coils never touch the floor. Such lines are able to outproduce their nonconveyorized counterparts by about two to one.

The plant's 36-in. slitting line typifies the modern approach toward faster, more accurate processing, labor saving, and protection of surface finish.

Slit steel first passes through a Pratt & Whitney electronic gage that indicates dimensions visually and also records them on chart

NERVE CENTER: Order boards and color coded tabs chart the progress of every order on every machine.



OUT IT GOES: Steel which arrived in giant-coil form, leaves in varied flat and coiled sizes.

paper. A red light flashes if dimensions go astray. Reels then coil the slit sections for automatic transfer to roller conveyors.

No Musclework — At stations along the conveyor route, coils are rewound to desired lengths and inspected visually. Next, each coil is power banded in about 40 seconds. Hydraulic lift units then stack the coils. There is no musclework involved, no damage to the finish.

To emphasize the taboo on manual handling, the plant has 21 overhead and gantry cranes. They roam the number-coded bays, moving work along. At floor level, a fleet of fork lift and other types of industrial trucks work to ease the handling complex. All are fueled with modern liquid propane gas. There are also special scrap handling devices to overcome what was once a nuisance problem.

System Controls Jobs—The company's production control system is centered in a special room and is fully as modern as the plant's processing techniques. All jobs are followed with color coded work slips that show the type of metal being processed. Quick reference files yield the facts on every machine in the plant and every foot of metal in stock. Machine loading and customer scheduling boards show at a glance what job is on what machine and when it will be finished.

To cope quickly and efficiently with hundreds of daily orders involving thousands of metal items in storage or in process, Precision Steel installed an Integrated Data Processing system. Perpetual and up-to-the-minute inventory control is one of IDP's chief assets. Previously, the company needed a full day to update its inventory lists. Now, with IDP's business machines, tapes, and punch cards, the records on thousands of items can be renewed in a few hours.

Helps Salesmen, Customers—Each day, the company's inside salesmen get the latest facts on every foot of metal in stock. The inventory forms list types, sizes, chemistry, amount on hand, amount on order—even date of arrival—for every item the plant handles.

When a customer asks about the availability of any item, the salesman can reply in about 30 seconds. And because the inventory list is current, there is little chance of promising a customer something that's already been sold to someone else.

IDP also allows the company to review customer orders and project ahead on metal needs for individual plants. This permits systematic, balanced buying, with little danger that needs will be over or underestimated.

More IDP Gains—Posting profits on individual orders while they are being processed in the plant is still another IDP benefit. Moreover, the system enables Precision to complete all customer invoices within 24 hours.

A wage incentive system, based on time and motion studies, applies to Precision's plant personnel. It boosts productivity by inspiring workers to push orders through more quickly, and to make full use of the modern equipment at their disposal. It also gives management an important yardstick for gaging workforce performance.

Thus by applying modern methods to metal processing, to business routines, and to industrial relations, warehouses seem certain to play a more dominant role in steel distribution.

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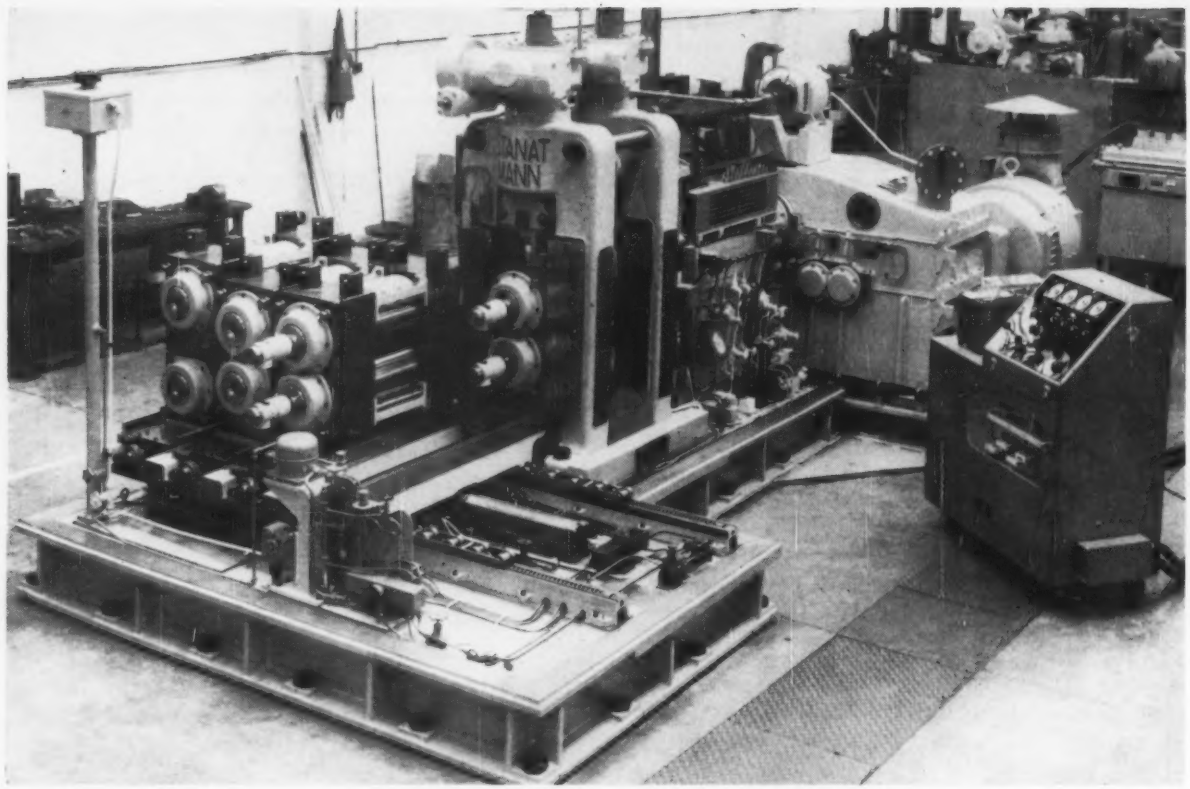


FOR ROLLING SERVICE: Roll-changing table (left) serves four different roll combinations. Maximum rolling load capacity is 600,000 lb at a speed of 100 fpm. A glove-box enclosure is available to seal the mill.

Remote Control Aids Rolling Mill

Electronics Takes Over Roll Changes on Special Jobs

Through remote control, a rolling mill fits the specialty job of processing nuclear fuel elements.

In the one mill, four different roll assemblies take care of various rolling needs.

▪ Designed for working on nuclear fuel elements, a rolling mill features remote control of roll changing. It brings the advantage of covering a variety of rolling needs with one machine.

It enables processing a wide range of fuel elements on a small order basis. While conventional practice would call for a 2-high hot breakdown mill, a 2-high cold intermediate mill, a 4-high cold sheet finishing mill and possibly a form rolling mill, this single unit handles entire rolling needs.

Design Experience — The combination mill, a Stanat/Mann 2-high/4-high unit, was recently constructed by Albert Mann's Engineering Co., Inc., Basildon, Essex, England, for the Atomic Energy Commission of France. The 10-in. diam x 14-in. face width unit results from the experience of designing previous smaller models.

It's the larger weights involved that required the development of the roll-changing equipment. The mill has a 600,000 lb maximum rolling load capacity at 100 fpm.

It's fitted with a variable-speed 2-hp screwdown motor drive and a 100-hp electronically controlled Ward-Leonard type main mill drive. The system incorporates screwdown pressure gaging and metering of the torque transmitted through the universal joint spindles.

Seal for Safety — A glove-box enclosure is set up to seal the mill, with the reduction gears and pinion stand, as well as the drive motor being outside. It's a safety precaution in handling of radioactive materials. For example, even though Plutonium 239 is not among the most radioactive, the seal prevents any penetration or inhalation of plutonium-bearing dust.

The box can be of stainless steel and glass and fitted with neoprene gloves for operating the plant within. A further advantage is that inert gas at a small negative pressure can be introduced to enable rolling of materials subject to oxidation.

In changing roll setups, the operator at the control desk turns a selector switch to the appropriate position.

How Rolls Change — First, the screwdown disconnects from the top roll and elevates. Then the jibs retaining the chocks in the mill housings unlock, allowing the roll carriage to withdraw.

Next, with the roll assembly removed and the universal spindles supported, the roll carriage lines up with the new assembly selected. The spindles adjust to the roll centers of the new assembly.

Reverse procedure follows in locking new assembly in place.

Servo Gets Precision—Positioning of the top universal joint when in the 2-high position is carried out by a servo mechanism to an accuracy of ±0.005 in. A pulse generator technique controls the servo circuit.

Thyratrons supply the armature current for the screwdown motor. Inherent stability of the system makes possible close control of motor speed and smooth inertia-free control of tension application.

All electronic circuitry is enclosed in plug-in units to facilitate service or change in characteristics.

Uses Magnetic Clutch—The 2-hp motor adjusts the rolls through a double-worm reduction to the screwdown spindles. A magnetic clutch enables individual adjustment of each side of the mill.

Screwdown speeds vary from 0.18 mm per second for cold rolling to 2.6 mm per second for hot rolling. The screwdown motor drive is set up outside the glove box because of possible effects of arcing on motor armature in an inert atmosphere.

Instruments on the control desk show left-hand or right-hand roll pressure, or the sum of both. Load cells placed between the screwdown and the top roll chocks measure the pressures.

Measurements can also be taken of the upper roll neck torque, lower roll neck torque, or the sum of both. Here the signals are transmitted from strain gages via slip rings and brushes mounted on the universal joints.

Mill Fits Reactor Needs

Turns Out Plate and Sandwich Elements In Metallic or Compound Form

Fissionable Materials:

uranium — thorium — plutonium

Combine with Non-Fissionable:

stainless steel	**beryllium**	**copper**
aluminum	**titanium**	**silicon**
magnesium	**nickel**	**columbium**
zirconium	**chromium**	**molybdenum**

and their alloys.

OPERATOR'S CONVENIENCE: Dials indicate screwdown pressure and torque metering. Plug-in units simplify maintenance and system changes.

How Fabrication Affects Stainless Magnetic Properties

By W. S. Eberly, Metallurgist—Special Alloys, The Carpenter Steel Company, Reading, Pa.

To obtain desired magnetic properties in stainless steels requires choosing the right alloy for the job. Then that alloy must be properly processed and heat treated.

Here are basic pointers to help you avoid the common pitfalls.

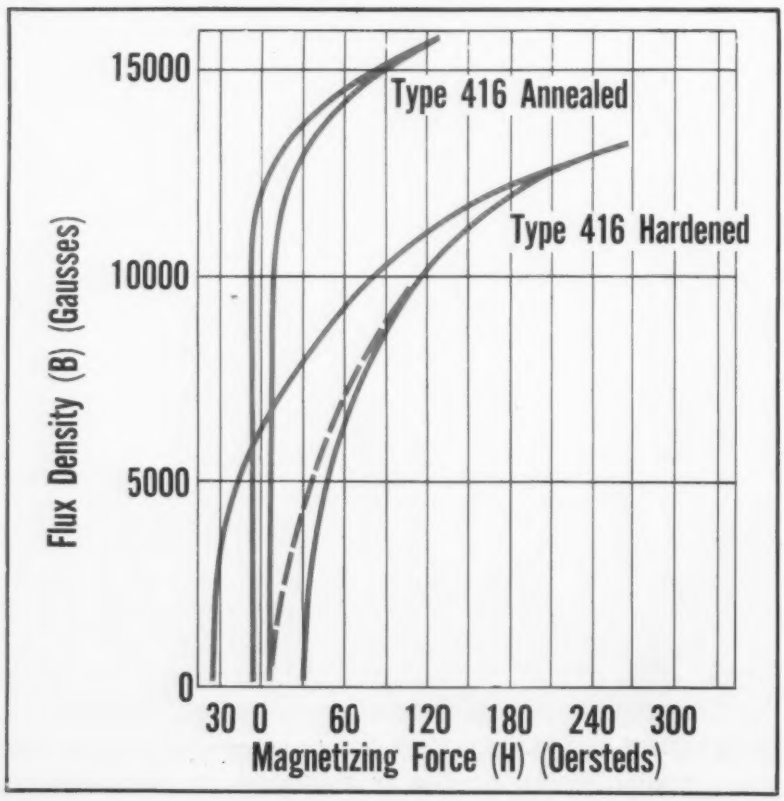
▪ It is probably fortunate that only a small percentage of all stainless steels produced are required to meet specific magnetic conditions. The reason: effects of fabrication on these properties are highly complex. So complex, in fact, that almost any forming or cold work is bound to affect magnetic characteristics to some extent.

This sets a rigid standard for the steel producer. It means that closely controlled fabricating procedures must be followed to meet magnetic requirements and to uniformly reproduce them from lot to lot.

Magnetic Applications — With ferritic stainless steels, it is usually important to obtain maximum permeability, highest saturation, lowest hysteresis loss, and least retained magnetism. The most desired magnetic property of the austenitic stainless steels is a permeability as close to 1.000 as possible.

In some applications, a specific permeability value in the end product is mandatory. Typical applications requiring such accurate control include cathode ray tubes, special instruments and controls, shipboard and geodetic survey equipment for non-magnetic stainless. For magnetic stainless grades, solenoid valves and relays are typical applications.

Annealed Properties



Annealing Helps — To get optimum magnetic properties for both magnetic and non-magnetic stainless steels, it is best to use the finished product in the fully annealed condition. An alternative is to closely control processing to meet desired magnetic conditions.

Variation in magnetic properties between heats of steel of the same nominal analysis can affect processing costs considerably. For example, Type 304 potential plates used in cathode ray guns are cold worked slightly. Often, this steel will not become magnetic after cold working. But when composition is not precisely balanced, the plate becomes magnetic and must be heat treated for satisfactory service.

Widely Used—Commercial ferritic stainless steel (AISI Type 400 series) are the "magnetic" stainless grades. They are used in magnetic cores, solenoid switches, pole pieces, and relays.

Magnetically, they are inferior to

core irons and silicon core irons for such applications. The reason is obvious: they contain only 70 to 88 pct iron, not 97 to 99.5 pct.

For best magnetically soft properties (maximum permeability, lowest residual magnetism), the ferritic stainless steels must be heat treated to remove all cold work stresses and minimize the amount of carbon retained in the matrix of the alloy.

For most magnetic applications, ferritic stainless steels are purchased in bar form—rounds, squares, and shapes. These bars are available from the mill as: hot-rolled unannealed, hot-rolled annealed, cold drawn or centerless ground unannealed or annealed.

Avoid Stresses — Annealed bar properties are superior to the unannealed because of lower hardness and a minimum of fabricating stresses. The magnetic properties of mill-annealed material are inferior to those of fully annealed fabricated parts because the bars are straightened after annealing. This results in some cold work stresses. It may cause variation in magnetic properties from lot to lot, since it is practically impossible to reproduce the same degree of cold work stress.

Ferritic stainless steels are available in both hardenable and nonhardenable grades. Hardening, however, produces detrimental effects on the magnetic properties (Fig. 1).

When fabricating a part from a martensitic stainless such as Type 416, only minor cold working operations are recommended. This is one of a group of easily machined stainless grades. In the fully annealed condition, it has a maximum permeability of 1080, residual magnetism of 11,700 gauss, and a coercive force of 5.40 oersteds.

Drawing Effects—Cold drawn as little as 5 pct, its maximum permeability drops 20 pct, and its coercive force increases almost 30 pct. When it is heat treated to a hardness of Rc 40, its magnetic properties are very poor. Maximum permeability is only 10-11 pct of the annealed value and coercive force is more than 6 times greater.

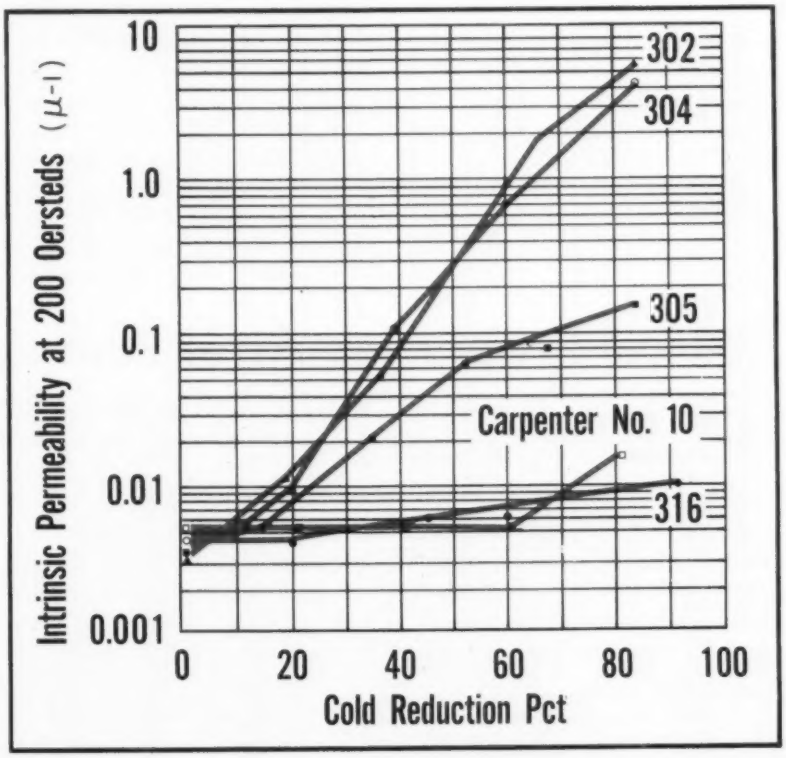
If an application is not too critical in terms of magnetic properties, the mill-listed properties may be acceptable. When the best degree of uniformity and magnetic soft conditions are required, an anneal after all fabrication (machining and forming) is absolutely necessary. Typical magnetic properties of bars "as shipped" are listed in Table 1.

Two Approaches—As for heat

Properties of Bar Stock

Stainless Type	Condition	Size	μ Max	Hc	Br	Hardness
410 & 416	Mill Annealed	½" rd.	700/1000	5.0/8.0	8000/11000	85/92 R_B
410 & 416	Cold Drawn	½" rd.	500/800	7.0/10.0	8000/11000	93/100 R_B
410 & 416	Hardened	½" rd.	100/150	32/38	6000/7000	40 R_C
430 & 430F	Mill Annealed	½" rd.	600/1100	5.0/7.5	8000/10000	85/92 R_B
430 & 430F	Cold Drawn	½" rd.	400/600	7.0/10.0	7000/9000	93/100 R_B
446	Mill Annealed	½" rd.	400/700	5.0/7.5	7000/9000	88/98 R_B
446	Cold Drawn	½" rd.	300/400	9.0/12.0	6000/8000	98 R_B/25 R_C

Effects of Cold Working



treating, pack annealing is satisfactory if surface oxidation can be tolerated. Dry hydrogen atmosphere (dew point less than —60°F) is recommended where an oxide-free, bright surface is required.

The preferred annealing temperature is just below the A_1 temperature for the alloy. This temperature assures retaining a ferritic structure with the least amount of carbon in the matrix. After holding at the annealing temperature for 1 or 2 hours, a slow furnace cool is preferred. This would require about 5 hours to reach 1000°F or about 100°F per hour.

Below this temperature, faster cooling rates are permissible. The effect of various annealing temperatures on a number of ferritic grades is shown in Table 2.

For Corrosion — The so-called non-magnetic, austenitic stainless steels contain a minimum alloy content of about 15.5 pct Cr and 7 pct Ni. These alloys are not hardenable by heat treatment. Their corrosion resistance is better than that of the ferritic group of steels.

Fully annealed, their magnetic permeability generally falls between 1.003 and 1.006 at a magnetizing force of H-200 oersteds. In this respect, there is little difference between alloys. A principal difference is the stability of the austenite when subjected to cold work or deformation. The effect of cold working on the magnetic properties of several typical steels is shown in Fig. 2.

Higher alloy austenitic grades (such as Type 316) are fairly stable magnetically, but they work harden at a rate comparable to Type 302. Type 305 can be severely cold worked, but its magnetic properties cannot match those of Type 316.

Special Alloy—Unless the part is to be annealed, it may be machined but not spun, drawn, or coined. Mild forming by blanking is permissible. An exception to these special handling requirements is a modified Cr-Ni-Mn austenitic stainless grade (Carpenter No. 10).

This alloy was especially developed for applications requiring extreme amounts of cold working such as cold heading operations. Because of its low rate of work hardening, severe cold working does not disturb its magnetic properties (Fig. 2).

The alloy maintains its low magnetic permeability after being reduced as much as 60 pct by cold working. Even at 80 pct reduction, the increase in permeability is less than 1.5 pct above the value of the fully annealed material.

Careful Specs—There are a variety of applications for the austenitic stainless steels in strip and bar form, requiring maximum permeability values. In addition, hardness requirements may be specified. As a rule, no difficulty is encountered if the items are bought in the full-annealed condition. Materials bought in the hot-rolled, cold-drawn, or cold-rolled conditions may be problematical.

When ordering for magnetic applications, always spell out magnetic properties in your materials specification. It pays to make sure that your supplier can provide consistent properties from one shipment to the next.

Typical Properties After Annealing

Stainless Type	Heat Treatment	Size		At μ Max		At H-120		Hardness
			μ Max	H	B	Hc	Br	
430F	1450°F 2 hr. furn. cool	1/2" Rd.	1232	6.60	8150	4.55	9810	73/74 R_B
430F	1450°F 2 hr. furn. cool	1/2" Rd.	1140	6.40	7200	3.91	9300	73 R_B
430F	1600°F 2 hr. pack annld.	1/2" Rd.	1108	6.4	7600	3.71	9250	69 R_B
430F	1700°F 2 hr. pack annld.	1/2" Rd.	962	6.2	6150	3.5	6680	71 R_B
430F	2050°F H_2 annld.	1/2" Rd.	840	6.0	5000	2.1	4430	78 R_B
430	1450°F 2 hr. furn. cool	1/2" Rd.	1415	4.1	5720	3.45	10440	74 R_B
430	1450°F 2 hr. furn. cool	1/2" Rd.	1870	3.9	7300	3.12	11350	74 R_B
430	1600°F 2 hr. pack annld.	1/2" Rd.	1290	6.3	8100	3.45	8900	71 R_B
430	1700°F 2 hr. pack annld.	1/2" Rd.	1046	6.5	6800	3.30	6950	75 R_B
430	2050°F H_2 annld.	1/2" Rd.	612	5.3	3250	3.1	3710	75 R_B
416F	1450°F 2 hr. furn. cool	1/2" Rd.	910	8.9	8100	6.2	10700	78 R_B
416F	1450°F 2 hr. furn. cool	1/2" Rd.	916	11.3	10380	6.15	10930	76/77 R_B
416F	1600°F 2 hr. pack annld.	1/2" Rd.	975	6.65	6490	4.8	7820	71 R_B
416F	1700°F 2 hr. pack annld.	1/2" Rd.	710	9.0	6400	4.8	6370	71 R_B
416F	2050°F H_2 annld.	1/2" Rd.	490	7.55	3700	4.65	4100	81 R_B
446	1450°F 2 hr. hurn. cool	7/8" Rd.	814	9.1	7400	4.0	6420	89 R_B
446	1450°F 2 hr. furn. cool	7/8" Rd.	812	9.0	7300	3.9	6050	91 R_B
446	1600°F 2 hr. pack annld.	7/8" Rd.	857	6.81	5850	3.55	4860	82 R_B
446	1700°F 2 hr. pack annld.	7/8" Rd.	1160	5.1	5900	1.8	3960	87 R_B
446	2050°F H_2 annld.	7/8" Rd.	1180	4.75	5600	1.9	3500	85 R_B
416	1450°F 2 hr. furn. cool	1/2" Rd.	1081	6.4	6950	5.35	11800	75 R_B
416	1450°F 2 hr. furn. cool	1/2" Rd.	1055	6.4	6750	4.5	9500	75 R_B
416	1600°F 2 hr. pack annld.	1/2" Rd.	1070	8.65	9250	5.21	11300	74 R_B
416	1700°F 2 hr. pack annld.	1/2" Rd.	710	9.10	6450	5.05	6750	73 R_B
416	2050°F H_2 annld.	1/2" Rd.	625	10.5	6600	5.3	5860	85/86 R_B
410	1450°F 2 hr. furn. cool	1/2" Rd.	1110	6.35	7050	4.65	12300	80/81 R_B
410	1600°F 2 hr. pack annld.	1/2" Rd.	576	11.35	6550	7.3	7500	80 R_B
410	1700°F 2 hr. pack annld.	1/2" Rd.	69	74.0	5100	41.4	4030	35 R_C
410	2050°F H_2 annld.	1/2" Rd.	70.5	74.5	52500	44.5	4400	40/41 R_C

TOOL FOR THE JOB: Needles conform to surface to get efficient cleaning action in hard-to-get-at places.

Needles Add to Air Gun Output

A bundle of needles on the business end of a new air gun goes to work on the tough jobs.

Conforming to rough surfaces, holes and corners, the needles solve many cleaning problems.

▪ A light-weight air-operated unit tackles tough cleaning and descaling jobs. Key to its efficiency is a set of rapidly reciprocating hardened-steel needles.

By pounding the surface being worked, the needles rapidly remove paint, rust and scale. One feature is the ability of the needles to conform to the contour of irregular-shaped surfaces.

In addition, the needles can reach into crevices, holes and corners to clean out difficult and confined places. Non - sparking needles are available for work in dangerous inflammable areas.

Called the Von Arx Air Gun, the unit is available in three sizes. Kits are complete with accessories including adapter chisels. The setup is marketed by The Marindus Co., New York.

Two Needle Styles—Three sizes of needles come in two styles, chisel-end and blunt-end. The chisel-end needles break into really hard scale and are used for roughing up concrete.

Blunt-end needles have a more gentle polishing action. They perform such jobs as cleaning brick, stone or metal surfaces and removing paint, rust or scale.

Air Serves Well—In operation, air continually flows over the working surface, removing rust and paint, and leaving the surface visibly clean. Normal working pressure is 88 psi and air consumption is 12.5 cfpm.

Maintenance is restricted to the usual upkeep and lubrication required for air tools. Needle life is about 500 hours in normal operation. Needles can be re-sharpened as required.

Stretch Former Compensates For Yield Strength Variations

Designed to cut high scrap losses in contour forming superalloys, this machine first tests the yield strength of each workpiece.

■ Stretch-forming machines are reaching new heights of refinement to cope with the job of contour-forming high strength, heat resistant metals for missiles and aircraft.

For one thing, these metals have little stretch to start with. Then, too, the stretching (yield) point varies so much that scrap rates of 80 pct are common on some formed missile parts.

One of the most delicately controlled large stretch formers ever built is designed to compensate for these yield point variations, thereby slashing scrap rates. By so doing, and by virtue of its ability to form a 360° ring in one pull, it's expected to pay for itself in a year's time.

Made by the Cyril Bath Co., Cleveland, the $350,000 machine has a 50-ton capacity. It's being installed at the Convair Astronautical Laboratory, San Diego, where components for Atlas missiles are made.

BIG STRETCH: Bath Co.'s president, Cyril Bath, shows superalloy missile ring formed in one piece on new machine to save time and scrap.

Tests in Advance—In trial runs, the new unit showed it could cut scrap rates drastically. It gives each workpiece a tensile test to determine its yield point before forming begins. This is done with a new "tensiometer," a complex strain gage mounted on the gripper arm.

The testing device is coupled with precision hydraulic cylinders, used for the first time on a machine of this size. Working together, these units permit tension control to within 50 psi. Hydraulic power also provides infinitely variable speeds and allows working to closer tolerances.

The 92-ft long machine will be used initially to contour form 10-ft diam nose cone rings to a full circle in a single radial draw. (At present, rings are made by weld-joining four curved sections.) Later it will form sheet parts from stock ranging up to 38 in. wide by 30 ft long.

Narrow Margin — The problem with many of the new aircraft and missile alloys is that most of the duc-

tile properties are sacrificed for ultra high strength. Abnormally high scrap rates come from the narrow margin between yield strength and ultimate strength—about 5 pct—within which the contour forming unit must work. To complicate matters, the yield strength may vary greatly from what is considered the norm.

For example, most work on Series 300 stainless is done with material rated at 140,000 psi yield strength. But with mill tolerances of ±10 pct, workpieces can start to stretch at anywhere from 126,000 to 154,000 psi.

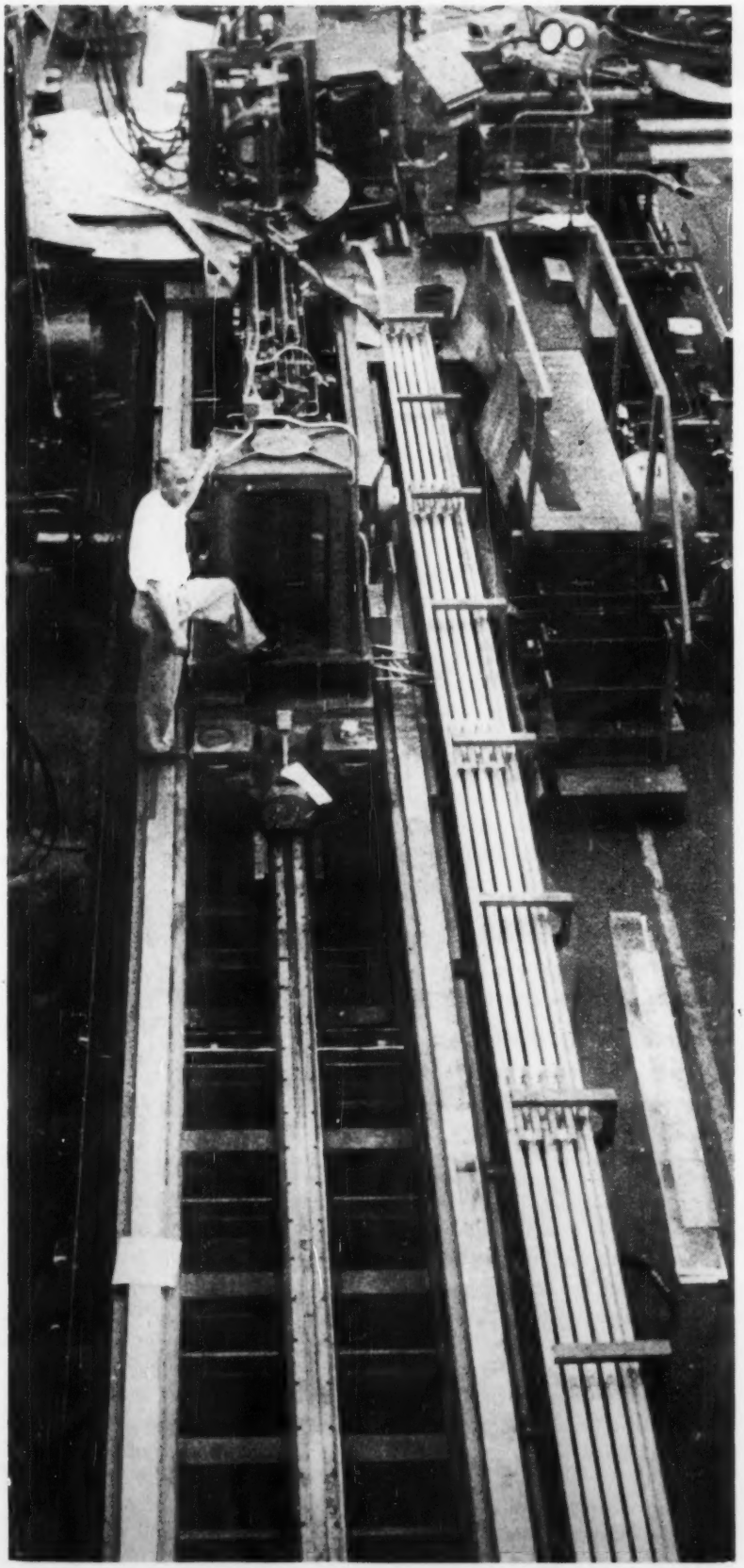
Why They Break — Previously, machines would be set for the nominal 140,000 psi rating. If the actual yield point was below this, workpieces would rip and have to be scrapped.

Yet, to keep missile weight to an absolute minimum, small structural shapes must be severely stretched. A 120-in. long structural to be formed into a ring, for example, will be stretched 15 pct to 138 in., or within 5 pct of the 144-in. length at which it would break.

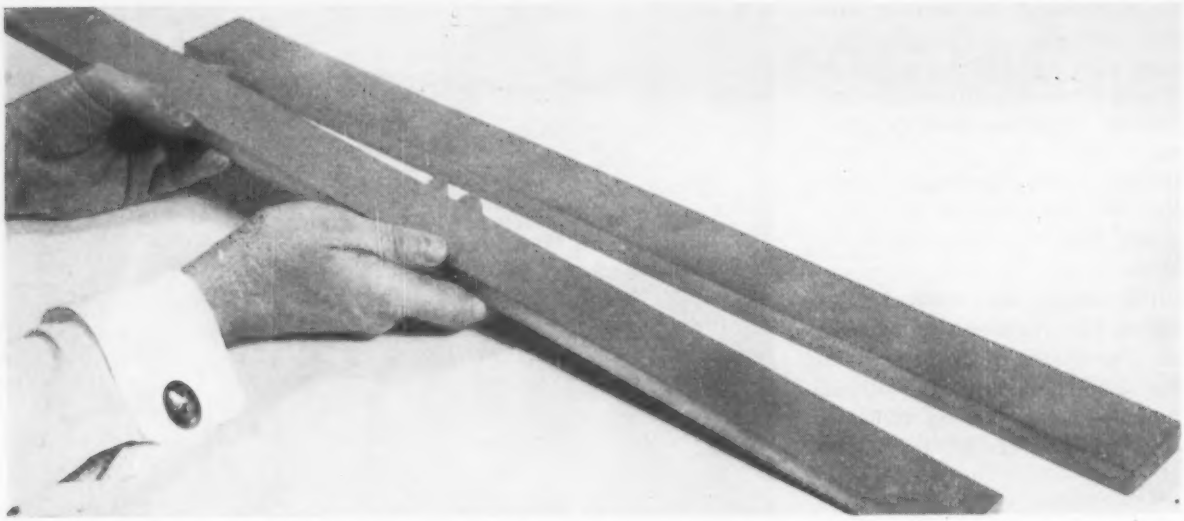
Besides the overall narrow margin between yield point and ultimate strength, missile-part makers also find yield point variations of up to 10 pct in different areas of the same sheet of steel.

Hot Subject—"This is one of the hottest subjects in metallurgy today," says Harry McQuaid, Cleveland metallurgical consultant. "Variations like this are due principally to casting the steel in large ingots," he maintains. "This causes inclusions which, after rolling, make the sheet strong longitudinally and weak transversely. The solution lies in casting smaller ingots, using vacuum melting and slower cooling."

Major advantage of the new Bath machine is that it forms full 360° rings or spirals. Also, it compensates for springback by strengthening the metal to its plastic range before contouring begins. Workpieces are formed a fraction of an inch at a time.



LONG ONE: New machine is 92 ft long, was shipped in four freight cars to San Diego, where Convair Astronautical Lab makes missile parts.



SAMPLE BARS: Pressed in the laboratory, these metal powder bars combine close tolerances and good finish.

Process Compacts Metal Powders Into Continuous Bars

By **F. Emley and C. Deibel,** Materials Engineering Dept., Westinghouse Electric Corp., East Pittsburgh, Pa.

A simple compacting process transforms metal and ceramic powders into sheet, strip, or bar.

Continuous, it produces bars or strip of large cross-section with excellent surfaces and edges.

▪ Both ceramics and powder metallurgy deal with a common problem: the formation of solid material from powders with the help of heat and pressure. The largest field of application involves forming the powder raw material into the shape of the finished product by molding or compacting. Heat then serves to sinter the powder to form a strong aggregate.

A new process now presses the powder on a continuous basis into bars which can be given further processing or can be used as is. As versatile as it is simple, it can produce pressed bars of many different metal, alloy, and ceramic compositions. Developed by Westinghouse Electric Corporation, Pittsburgh, it has been successful with powders of iron, copper, molybdenum, tungsten, and a number of alloy blends.

Many Applications—Some of the possible applications of the process underline its future potential. For example, it can be used to fabricate large sizes of refractory metal sheet, strip, or bar. It also provides a possible continuous process for fabricating tungsten filaments.

It can turn out sheet or strip alloys with precise composition control and no problem of segregation. Or it can be used to produce ceramic bars, magnetic ferrites, thermal bimetals, or clad reactor core elements.

The operating principle on which the process is based is relatively simple. Powder in a trough-like container is compressed by a sloping punch. Some of the powder is completely compacted, but that part under the sloping portion of the punch is compacted a variable amount—from full compaction to zero. By reciprocating the sloping punch while advancing the powder, the bar is formed. The accompanying sketch shows the arrangement of a typical set-up.

The width of the pressing surfaces determines bar width. The length of the pressing surfaces is determined by 1) the angle between them, 2) desired thickness and density of the compacted bar, and 3) the compaction characteristics of the powder to be pressed.

Although the pressing action in the process is intermittent, a continuous bar of pressed powder is formed. The cross-sectional area and the density of the green bar are

How Powders Pressed

Materials	Powder Size	Powder Fill (inches)	Compacting Load (tons)	Sintering Treatment	Final Height (inches)	Density (Percent of Theoretical)	Remarks
Copper	−100 mesh	.75	60	1 hr. @ 1000°C	.25	90	Excellent bar
Copper	−100 mesh	1.0	60	1 hr. @ 1000°C	.345	86	Excellent bar
(Repressed)	—	—	100	—	—	91	Slight surface marking
(Repressed & Sintered)	—	—	—	1 hr. @ 900°C	—	94	
Easton RZ Iron Powder	−100 mesh	1.0	60	1 hr. @ 900°C	.625	—	Excellent bar
Tungsten plus 1% paraffin	−325 mesh	1.0	30	3½ hr. @ 1200°C	.5	61	Bar looked good, but porous
	—	—	—	3½ hr. @ 1000°C	—	—	
Molybdenum	−325 mesh	1.0	15	1 hr. @ 850°C 3 hr. @ 1000°C	.5	82	Heavy shrinkage, but excellent bar
Niobium Sponge	Rondelles	1.0	100	None	.25	—	Compacted acceptably for use as consumable electrode for melting

limited by the capacity of the press used. The length of the bar is unlimited. A continuous bar will be formed for as long as powder is fed into the system.

Into Sintering—The process can be readily automated so that bars of unlimited length can be fed directly into a sintering furnace. A mechanism can be designed for feeding the powder onto a carrier, moving it automatically into the pressing mechanism, and then transporting the pressed bar into the next processing stage.

To date, the process has been tried on an experimental basis only. For this purpose, a simpler setup was designed and built to produce bars of limited length. The pressing punch was attached to the upper ram of a manually controlled hydraulic press.

Instead of an automatic powder feeding and transporting mechaism, a simple U-shaped channel was constructed with removable sides for easy removal of the pressed bar.

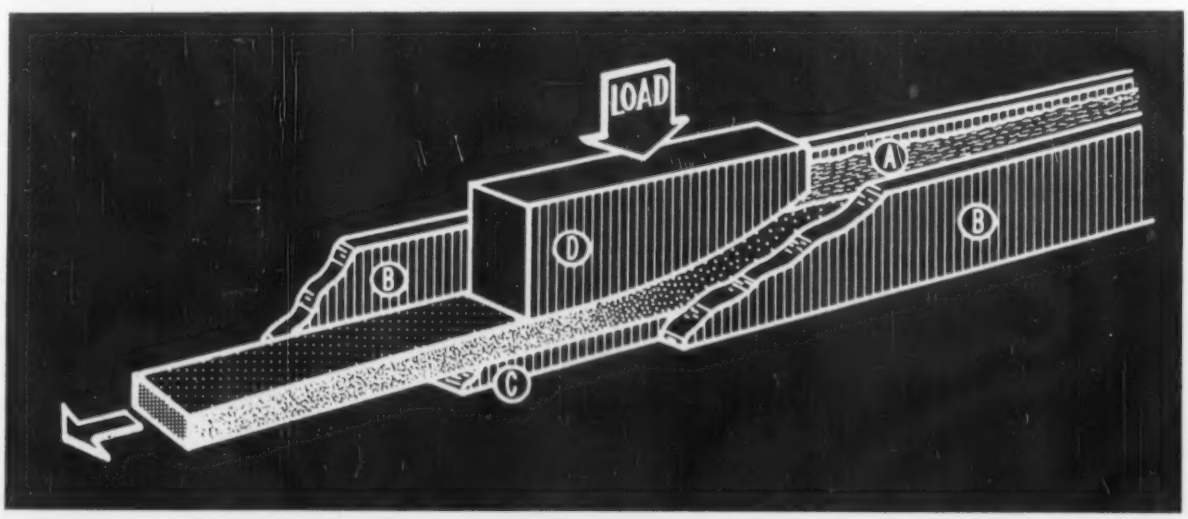
Lab Tested — The channel was filled with loose powder to a desired height. The cyclic operations of pressing and advancing the powders were manipulated by hand.

In this setup, the whole channel was advanced. When the right end of the channel was reached, the pressing operation was stopped. The channel parts were made from cold rolled steel.

Several different powder materials were successfully pressed with this laboratory-scale equipment.

Laboratory pressed bars have ranged in thickness from one-fourth inch to one inch, in width from three-fourths inch to two inches, and in length up to 36 inches. Press loads used for typical bars have varied from a low of 20 tons to a high of 100 tons.

Principle of Continuous Compacter



Transfer Line Machines Several Cast Iron and Aluminum Parts

Automatic transfer machining doesn't have to be limited to high volume of one part. It can be made quite versatile, as this installation proves.

■ There's a new philosophy rampant among manufacturing managers these days. It holds that automation must do more — that with rapidly changing manufacturing conditions, you can't afford inflexible transfer machining lines.

The results of this thinking are showing up even in areas where transfer machining had scarcely been considered feasible before. One example is the transfer line set up to machine cylinder heads at General Motors Corp.'s Detroit Diesel Div.

Multiple Product Mix—Various engine models are built up from basic 2, 3, and 4-cylinder units. The problem in the machining of cylinder heads was to plan a single line that would machine all three designs. The Division's master mechanics worked with the machine builder, Detroit's Cross Co., to tailor equipment for the job.

The result is a new pattern in transfer machine versatility for larger parts. Ability to process the different size cylinder heads stems from adaptability of machine units, fixtures and components.

Changeover of the line from one size cylinder head to another takes no more than half a day at most. It will probably take even less time when operators and setup men become more familiar with the equipment.

Making the Switch—To make a change, operators relocate work-holding fixtures and positioning units, also switch feed dogs and positive stops. Several tool changes are also needed to convert the machine from 4-cylinder to 2-cylinder or 3-cylinder processing.

In addition, position locators in transfer dogs and idle station locators must be relocated. Fixed points in the transfer carrier are common for the 2 and 4-cylinder heads. A second set is incorporated for 3-cylinder work, however.

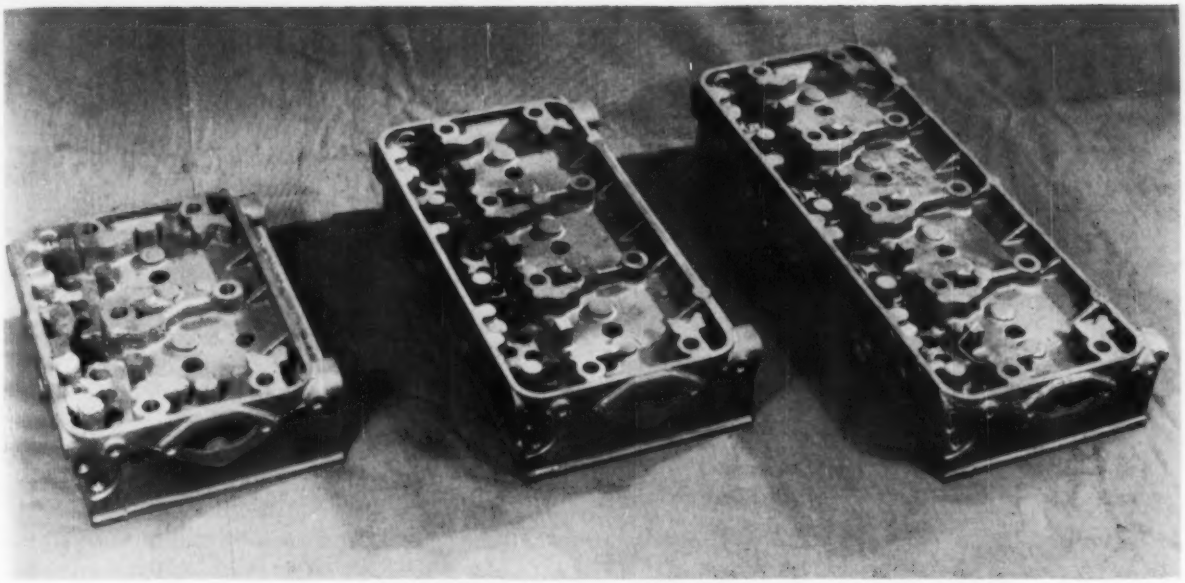
Furnishes Own Power—Machine units furnish power for repositioning the fixtures, except at two spots. These are a single spindle drill unit and an air test mechanism. At these two stations manually controlled hydraulic cylinders do the job.

The way-type fixture mounting used in this machine makes it easier to reposition fixtures. This design also gives a maximum "open" center for trapping chips and coolant within the machine.

Aluminum Too — While the cylinder heads now being made are cast iron, a complete coolant system, including filtration, is a part of the basic facility to allow for processing aluminum heads. The dual material requirement also influenced selection of an integral chip disposal system. It is in the base of the machine and does not tie into the central cast-iron chip disposal system in the plant floor.

Machining heads in the line are designed for quick conversion to

READY TO GO: Four-cylinder diesel engine head at start of line moves into station where both ends are straddle milled simultaneously.



DOES ALL THREE: Cast iron cylinder heads come in three basic sizes, are easily machined on one line.

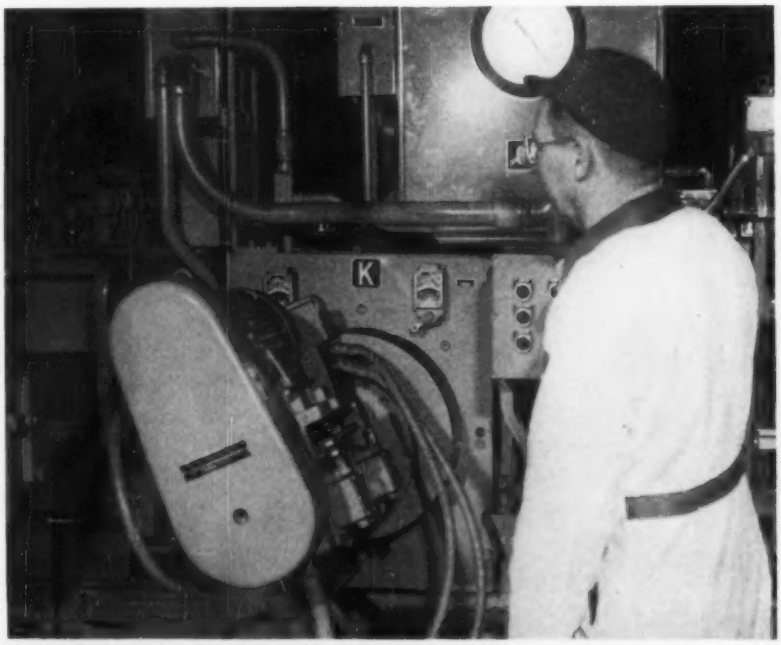
higher speeds for aluminum. All that's needed is to change several pickoff gears. Heads for drilling the deep oil gallery holes also have step-feed mechanisms. These are in addition to standard continuous feed arrangements, and are for use when the machine is set up to process aluminum.

New Type Transfer—The line uses a lift-and-carry mechanism for transfer between stations, and is one of the first to do so on this type of part. Locating surfaces on the heads are pre-milled. The lift-and-carry system protects these surfaces against scratching and scuffing, sometimes associated with slide-through transfer.

While this system has advantages for cast iron heads, it will benefit even more when the line is processing relatively soft aluminum.

Unusual Swing Head—Another feature that saves on both space and initial cost is a novel single spindle quill unit at station 12. It does multiple chamfering of oil gallery holes without reorienting the work.

This is done by mounting the drill head on a revolving drum plate, which swivels the unit automatically from hole to hole. After chamfering the first hole, the quill retracts and the unit swings over to align with the centerline of the second hole. This economy was made possible by the longer cycle time used for deep drilling oil gallery holes in preceding stations.



FLIP FLOP: Head, mounted on a revolving drum plate to chamfer oil holes, does one, then flops over automatically to chamfer the second.

In summary, the machining operations are typical of those in many metalworking plants: face milling, drilling, deep hole or "woodpecker" drilling, chamfering, tapping, and testing. One station air tests the critical oil gallery holes for casting density.

A new machine control system permits operation of the unit at partial or full capacity.

Grinder Takes on Roll Form Job

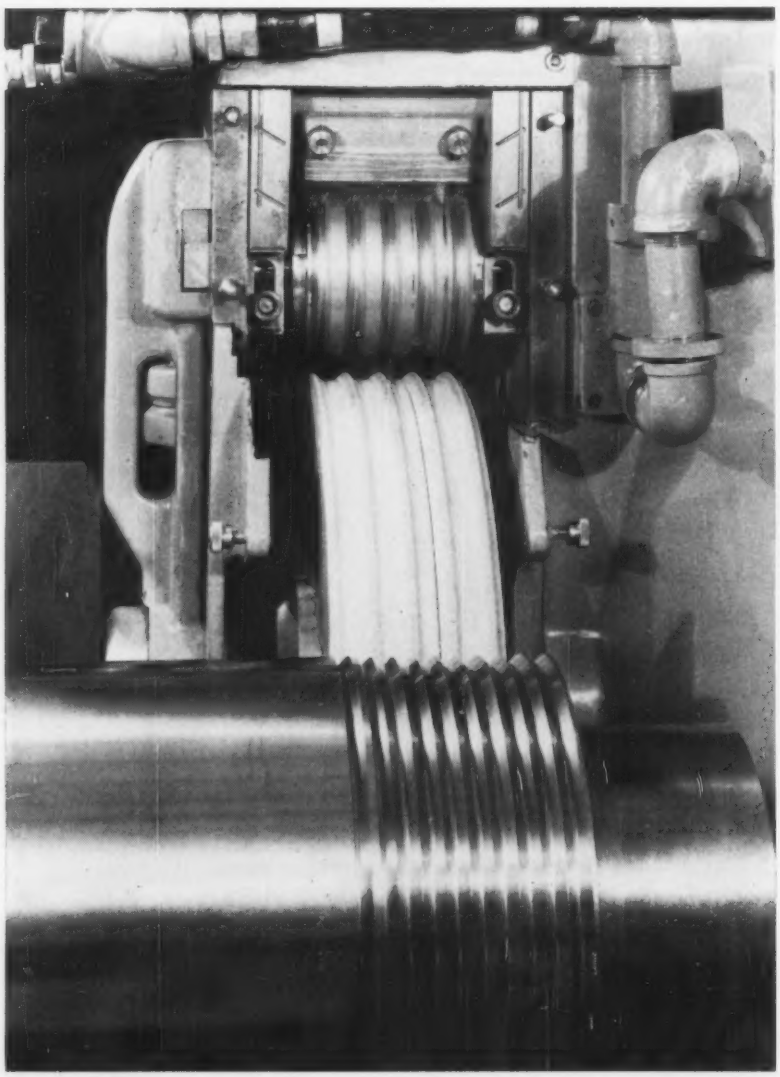
A new setup cuts forming time for rod mill rolls by 75 pct.

Added to this, it works on harder rolls to insure higher quality and longer roll life.

▪ A new method speeds forming and redressing of passes in rod mill rolls. Since it works on harder materials, it turns out a higher quality roll with longer roll life.

Developed by The Sheffield Corp., Dayton, the grinding setup offers spectacular savings in time and costs. For example, it takes only 40 minutes to redress 32 passes by removing 1/16-in. metal from a roll face 20½ in. long by 11-in. diam. This compares with 3 to 4½ hours by normal turning methods.

About roll life, all indications are that pass life of the new harder rolls will double. With the usual life of a pass being 8 hours, downtime to change passes will be substantially reduced.



FOR FAST FORMING: Crushtrue roll (top) dresses grinding wheel (center), which in turn forms desired contour in rod mill roll (bottom).

Experience Counts — The new method is an extension of Sheffield's Crushtrue wheel-forming and dressing process, used for precision thread and form grinding for many years. The process enables multiple grooves and forms to be ground from the solid in a single operation.

A hardened steel or carbide Crushtrue roll, with the same profile as desired on the workpiece, dresses the grinding wheel to the desired contour.

In a recent demonstration, a 5-ft finishing roll for No. 5 rod was processed. The 800-lb workpiece with face-width of 20½ in. by 11-in. diam was mounted between centers on a Sheffield Crushtrue Multi-Form grinding unit.

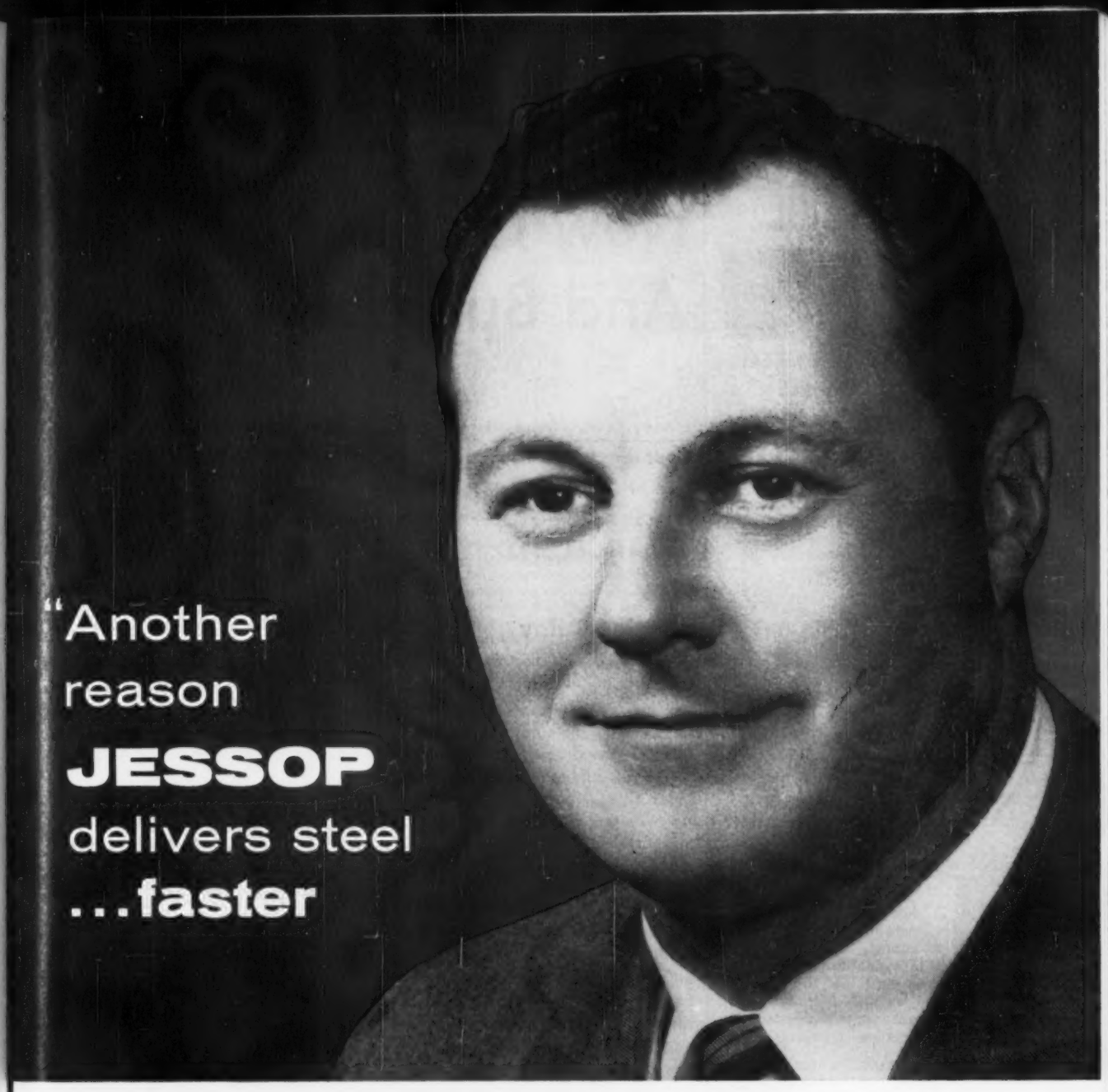
With eight passes ground simultaneously, four indexes of the part resulted in 32 passes in 70 minutes. Roll hardness was 84-86 Shore.

Stress Precision—Each pass was 0.217 in. wide by 0.075 in. deep with a 0.116-in. radius at the bottom. Center distance between one pass and the next was ⅝ in. Tolerance on width and depth was held to 0.0015 in.

Pitch or spacing from one pass to the next was held to ± 0.00025 in. Accumulated pitch error over the eight passes was within ±0.001 in.

In forming the Crushtrue roll with eight grooves, a Sheffield Micro-Form grinder does the job. A 50:1 pantograph and viewing screen permit circular or flat profile grinding directly from a drawing.

An automatic device, mounted directly above the wheel, automatically feeds the roll into the wheel until the full form of the roll, in reverse, is imparted. The device also redresses the wheel automatically after a preset number of rod mill rolls have been ground.



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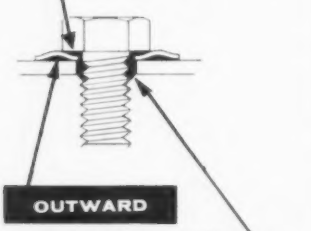
GIVES COMPLETE SEAL

UPWARD
to seal between underside of fastener and washer hole



OUTWARD
to seal between underside of washer and surface of material

DOWNWARD
to seal between clearance hole and fastener threads

BARTITE sealant material is an integral part of the metal washer, a single unit, ready for quick assembly and positive sealing action.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 123.

Brazing Alloy

A data sheet discusses a nickel base brazing alloy for joining stainless steel surfaces with large clearances. Nominal composition, metallurgical properties and engineering properties of the powder are listed. (Wall Colmonoy Corp.)

For free copy circle No. 1 on postcard, p. 123

Hydraulic Components

A hydraulic-pneumatic-vacuum catalog contains flow charts and helpful information for engineering and maintenance men. Data covers O-ring seal tube fittings, flare fittings, pipe fittings, tube benders and other hydraulic components. (Lenz Company.)

For free copy circle No. 2 on postcard, p. 123

Servovalves

Pressure control servovalves are featured in a catalog. The servovalves work in closed-loop systems to control load acceleration and they may be used directly as force transducers or pressure regulators. (Moog Valve Co., Inc.)

For free copy circle No. 3 on postcard, p. 123

Forged Unions

Forged steel unions are covered in a catalog. Unions include a drop-forged model in either Type 304 or 316 stainless (in screw-end or socket-welding types). Catalog also shows O-ring flange unions and tongue and groove flange unions. Streamlining eliminates overlapping of both 2- and 4-bolt types. (W-S Fittings Works, H. K. Porter Co., Inc.)

For free copy circle No. 4 on postcard, p. 123

Anchor Bushings

Press type anchor bushings for drill templates are described in a brochure. Bushings simply press into drilled or punched holes in aluminum drill templates. Drill sizes accommodated: No. 55 (0.052) through 7/16 (0.4375). (Hi-Shear Rivet Tool Co.)

For free copy circle No. 5 on postcard, p. 123

High-speed Motors

High-speed synchronous motors appear in a 4-page bulletin. (General Electric Co.)

For free copy circle No. 6 on postcard, p. 123

Roll Feeds

Automatic roll feeds are covered in a catalog. Specifications describe 15 standard automatic roll feeds and accessories. (Durant Tool Co.)

For free copy circle No. 7 on postcard, p. 123

Tooling Plate

Aluminum rolled tooling plate shown in a brochure has uses in industrial tools, jigs and fixtures. The tooling plate is lightweight, has fine grain, freedom from porosity. It boasts excellent machined flatness, easy machinability, weldability

and comparable economy. (Kaiser Aluminum & Chemical Sales, Inc.)
For free copy circle No. 8 on postcard, p. 123

Groove Micrometer

An inspection tool introduced in a folder rapidly, accurately measures internal groove widths and groove locations. Otherwise hard-to-mike measurements can be made easily while workpieces are still on the machine. (Navan Products Inc.)
For free copy circle No. 9 on postcard, p. 123

Small Drill Presses

Sensitive drill presses are covered in a data sheet. Two models appear; one has 1-in. stroke; the other, 2-in. stroke. The sheet describes them as "ideal for small hole production drilling." (EPF Tool & Mfg. Co.)
For free copy circle No. 10 on postcard, p. 123

Bandsaw Blades

High speed steel bandsaw blades are described in a data sheet. The blades cut faster, take greater feeds, last longer, it says. Standard or hook tooth designs are available. (American Saw & Mfg. Co.)
For free copy circle No. 11 on postcard, p. 123

Fabrication

Got a fabrication problem? If so, a new catalog may supply an answer. It details a system of punching, notching, nibbling and drilling. Tools fit press brakes, stamping presses. (Wales-Strippit, Inc.)
For free copy circle No. 12 on postcard, p. 123

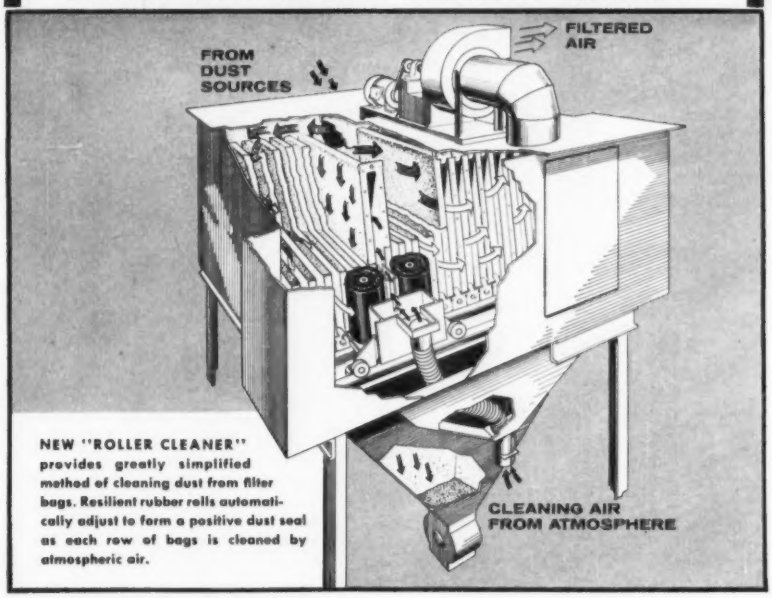
Precise Parts

How to cut precision part costs is told in a 16-page booklet. It shows numerous powdered metal part uses and designs. (Reese Metal Products Corp.)
For free copy circle No. 13 on postcard, p. 123

Planishing Unit

A data sheet shows a new weld roll planishing machine. It's a combination longitudinal and circumferential unit. The machine im-

SLY DUST FILTERS
Prevent Air Pollution... Reclaim Materials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EXAMPLE

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The beauty and smooth operation of fireplace curtain screens depend on accurate forming, even spacing, and neat appearance of the mesh. The wire used must be of correct temper, diameter and finish. Uniformity of these properties is of prime importance. Leading fireplace equipment makers choose Continental Wire because it possesses these features dependably, in coil after coil. The ability to take intricate forming is an important reason why Continental Wire is specified for scores and scores of other products made with wire. Continental Curtain Screen wire, 19 gauge through 20 gauge inclusive in size, is available in 500 pound to 650 pound catchweight single length coils packed in Leverpac Drums for faster weaving with less down time, cleaner handling and better storage. For wire in practically any size, finish, temper or analysis, in low or medium low carbon steels, see Continental first!

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FREE LITERATURE

proves welds in aluminum alloys, stainless steel, unalloyed titanium, carbon and low-alloy steels. (Airline Welding & Engineering).

For free copy circle No. 14 on postcard, p. 123

Conveying Setups

Positive pressure pneumatic conveying systems are explained in a bulletin. Systems range in capacity from 1000 to 60,000 lb per hour. (Sprout, Waldron & Co., Inc.)

For free copy circle No. 15 on postcard, p. 123

Coolant Filter

Described in a bulletin is a high efficiency filter for cleaning coolants or cutting oils. It effectively removes ferrous and nonferrous contaminants. (Infilco Inc.)

For free copy circle No. 16 on postcard, p. 123

Miller Tracer

Fully automatic, a three-dimensional programmed control system serves milling machines. It ups tool life, cuts costs and work time. The system provides uniform feed rate, even on 90° walls. (True-Trace Sales Corp.)

For free copy circle No. 17 on postcard, p. 123

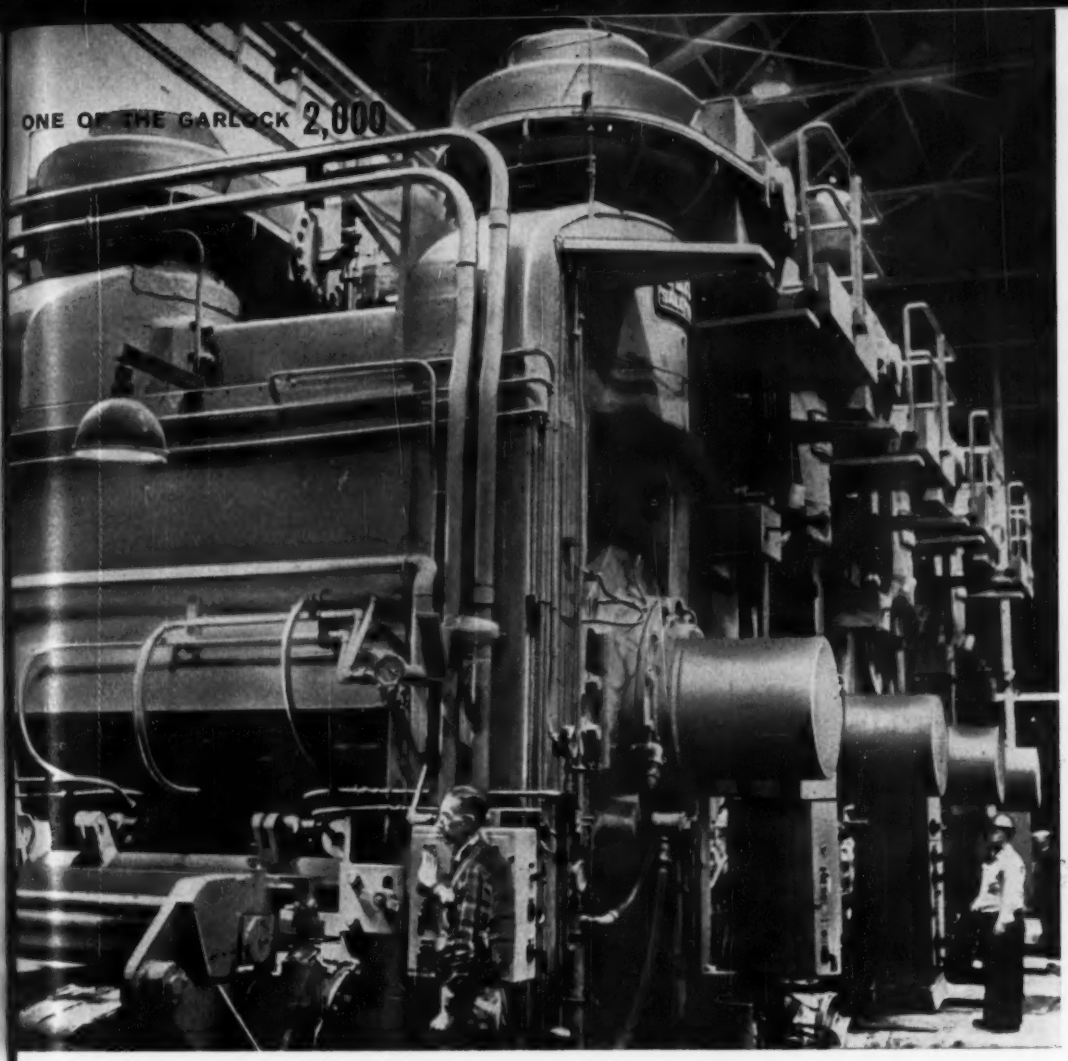
Extrusion Dies

A die catalog is available from a manufacturer of magnesium alloy mill and finished products. Full scale, dimensioned diagrams of several thousand dies show magnesium's versatility in dies for: rods, bars, tubes, structurals, solid shapes, hollow and semi-hollow shapes. (For free copy write on company letterhead to White Metal Rolling & Stamping Corp., 92 Moultrie St., Brooklyn 22, N. Y.)

Strain Gages

Etched foil strain gages are reviewed in a 6-page folder. They have uses in mechanical research and stress analysis. (Electronics and Instrumentation Div., Baldwin-Lima-Hamilton).

For free copy circle No. 18 on postcard, p. 123



Model 64 assembled KLOZURE for back-up and work rolls. Designed for large shafts, severe service.

Model 82 bonded KLOZURE for back-up and work rolls, normal to high speeds. Comes as large as 44" diameter.

Model 21 or 23 Split-KLOZURE for installation without disassembly of equipment. Medium-speed service.

Model 142 face type KLOZURE for mill rolls. Designed to seal surfaces perpendicular to shaft.

Model 53 assembled KLOZURE for table rolls, normal to high speeds. Withstands temperatures to 250° F.

On all mills—Bearings are fully protected by Garlock KLOZURE* Oil Seals

Everywhere in steel—on hot and cold strip mills, blooming and structural mills, rolling mills—Garlock KLOZURE Oil Seals prevent leakage of vital bearing lubrication. And, they further prevent damage to the bearings by sealing out dirt, spray, and other foreign matter.

Model 142, for example, keeps water splash and scale out of bearings at the shoulder of a mill roll. Models 64 and 82 are ideal for protecting bearings on back-up and work rolls; Model 53 is recommended for table rolls; and, where equipment can't be dismantled easily, Model 21 or 23 split-KLOZURES are the choice.

All KLOZURES are oil and grease resistant . . . impervious to water, mild acids, alkalies . . . non-abrasive . . . withstand temperatures from −40° F. to +250° F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500° F.

KLOZURE Oil Seals are another part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. Call your local Garlock representative, or write for Catalog 20.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

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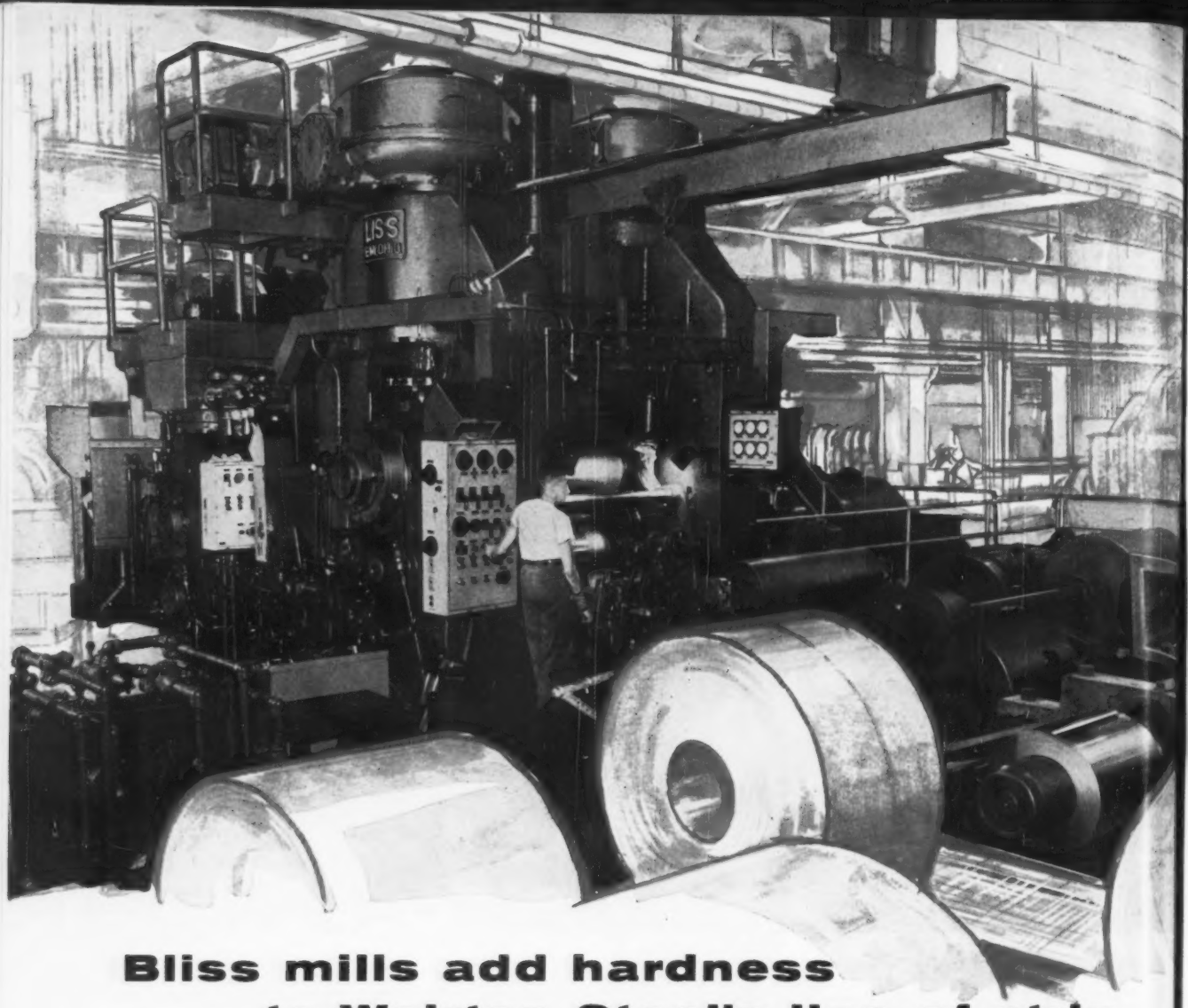


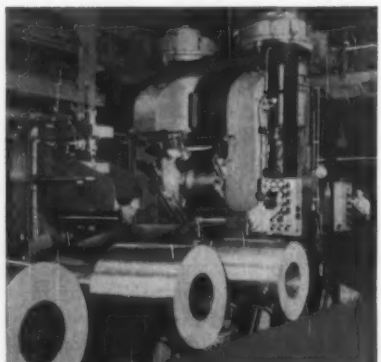
Bliss mills add hardness to Weirton Steel's line of strip

Weirton Steel Co., Division of National Steel Corp., the nation's largest independent producer of tin plate, uses a Bliss mill to achieve exacting temper and quality of its strip prior to plating. It is a four-high, two-high two stand tandem mill recently installed in its Weirton, W. Va., plant.

Through this unit Weirton has rolled a wide variety of steels in gages ranging from .00435 to .0147 inches and at an average maximum speed of 4,500 feet per minute. Well known products such as Weircote and Weirzin zinc coated steel are just two of Weirton's steel products to which this mill contributes.

A second Bliss mill tempers high-carbon, high-phosphorous, deep-drawing and galvanizing steels at the rate of 800 tons a day, while a new Bliss 48-inch slitting line is used to slit galvanized steel in gages from .0135 to .135 inches at speeds of 200 to 1,000 fpm. Both rolling mills are equipped with Amerigear-Bliss spindles.

These three installations provide one more example of the ready acceptance of the name of Bliss in the rolling mill industry—both here and abroad. To learn how Bliss equipment can help increase your rolling capacity, simply write for our new 84-page Rolling Mill Brochure, Catalog 40-B.



Four-high temper mill handles 30,000-lb. coils at speeds up to 3,500 fpm...has rolled 1,000 tons in a single day. Back-up rolls were supplied by Bliss' Mackintosh-Hemphill Division.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E.W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Instrument Rental

Need a special instrument? But not enough to buy one? If so, it may pay to read a bulletin on an instrument rental service. It's nationwide, too, through the company's numerous service shops. Renting has other assets also. Some 13,000 instruments are available. (General Electric Co.)

For free copy circle No. 21 on postcard

Conveyors

Roller and wheel conveyors are shown in a 72-page booklet. It covers: light and heavy-duty wheels and a complete line of conveyor rollers. The latter range from 1⅜ to 6½-in. diam in 60 to 16,000-lb capacities. (Mathews Conveyor Co.)

For free copy circle No. 22 on postcard

Pig Iron

A 28-page book gives a brief history of pig iron production. It details a company's complete production facilities. (Republic Steel Corp.)

For free copy circle No. 23 on postcard

Air Conveying

A booklet describes a compact pneumatic conveying system for car, truck or bin unloading. It's especially for small and medium size bulk materials handling jobs. (Sprout, Waldron & Co., Inc.)

For free copy circle No. 24 on postcard

Insulation

You can cut installation cost of lines and vessels carrying high temperature gases under pressure. A bulletin tells how. It explains a patented internal insulation technique. This separates effects of temperature and pressure. Thus, normal wall thicknesses of inexpensive carbon steel piping can carry gases as high as 2000°F. (Insidline Div., Baldwin-Hill Co.)

For free copy circle No. 25 on postcard

Adjustable Drive

In ratings of ¾ to 7½ hp, an adjustable speed drive is outlined in a 6-page bulletin. It works on alternating current. The drive provides precise operating speeds for machine tools, process machinery, test equipment, windups, conveyors and similar equipment. (The Louis Allis Co.)

For free copy circle No. 26 on postcard

Solid Carbides

Packed with price and engineering data, a catalog lists 1230 standard-stock, solid carbide tools and burs. Its 148 pages contain speed and feed charts, machining recommendations, and thousands of metalworking production hints. (The Atrax Co.)

For free copy circle No. 27 on postcard

Sprockets, Couplings

In 20 pages, a catalog contains a complete listing of stock sprockets and flexible couplings for roller chains. (Acme Chain Corp.)

For free copy circle No. 28 on postcard

Chemical Milling

Eighth in a series, a design bulletin discusses recent advances in chemical milling steel alloys. Alloys include most steel and "super" alloys in any stage of fabrication bar sheet, cast, extruded, forged, spun and stamped. (United States Chemical Milling Corp.)

For free copy circle No. 29 on postcard

Brass Alloys

Importance of grain size in brass alloys is shown in a bulletin. It explains how selecting the correct ultra fine grain size cuts finishing costs. It also details how grain size,

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **4/23/59**

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FREE LITERATURE

or average crystal diameter, of brass strip is affected by annealing and cold rolling. (Bridgeport Brass Co.)

For free copy circle No. 30 on postcard

V-belt Drives

Modern ways to design V-belt drives are presented in a 32-page catalog. It explains a new power transmission concept. (The Gates Rubber Co.)

For free copy circle No. 31 on postcard

Welding

A welding products catalog has been combined with an informative guide to welding practice. It contains 32 pages. (Arcos Corp.)

For free copy circle No. 32 on postcard

Flexible Shafts

Design data on high-speed flexible shafting appears in a bulletin. (Stow Mfg. Co.)

For free copy circle No. 33 on postcard

Grinding Safety

Do's and Don'ts of grinding wheel safety are listed on a wall chart. (The Carborundum Co.)

For free copy circle No. 34 on postcard

Compressors

Oil-free compressors introduced in a 12-page bulletin come in 14 sizes. The heavy-duty units range from 95.6 to 939 cfm. (Joy Mfg. Co.)

For free copy circle No. 35 on postcard

Shear Fasteners

Shear fasteners which are as much as 70 pct stronger than present aircraft standards are described in two bulletins. (Standard Pressed Steel Co.)

For free copy circle No. 36 on postcard

Job Shop

In a dozen-page folder, a contract manufacturer displays its extensive facilities. The company specializes in making drawn shells, eyelets and metal stampings from any of hundreds of different alloys. It has turned out quality production items for electronic, aircraft, automotive, missile and general manufacturing uses. (Cly-Del Mfg. Co.)

For free copy circle No. 37 on postcard

Windows and Walls

Commercial projected aluminum windows and an economy wall system are outlined in two file folders. The economy wall is the first standard curtain wall system for one and two story buildings. It provides windows and panel sections in single units. This eliminates otherwise necessary labor. (For free copy write on company letterhead to Reynolds Metals Co., Box 2346, Richmond 18, Va.)

Office Planning

Efficient office layout is the purpose of a new design card. It gives do's and don'ts of office planning. The card gives suggested square footage for all types of offices. (Remington Rand Div., Sperry Rand Corp.)

For free copy circle No. 38 on postcard

Metalworking Units

A 280-page catalog describes and pictures an exceptionally complete line of English machinery available from stock. Showing small to huge equipment, it covers: machine tools, presses, sheet metal units, power articles, foundry and forge items, locomotives, cranes and other handling setups, small engineering tools, etc. (For free copy write on company letterhead to Mr. George Bentley, Adv. Mgr., Albion Works, Thos. W. Ward, Ltd., Sheffield, England.)

Carbides

Tungsten carbide tools, tool tips, dies and wear parts are covered in a 32-page catalog. A unique table shows how to get carbides at lower prices. (Adams Carbide Corp.)

For free copy circle No. 39 on postcard

When you want ALUMINUM SHEET...

CALL REVERE!

You can be sure, when you specify or order from Revere, that you will get not only fine metal but fine service, including Revere's cost-saving Technical Advisory Service if desired. Revere—now an integrated producer of aluminum—can supply you from large modern sheet mills in Baltimore, Md., and Chicago, Ill.

In addition to aluminum coiled and flat sheet, circles and blanks, both plain and embossed, Revere can furnish aluminum seamless drawn, welded and extruded tube; extruded shapes; forgings; foil; and primary aluminum pig and ingot.

It pays to do business with the most dependable sources of supply—such as Revere, which has been fabricating fine non-ferrous metals for more than 150 years.

Revere Aluminum Coiled and Flat Sheet
up to 48" wide and up to .125" thick

Alloys			
1100	3003	5005	5052
1145	3004	5050	5357

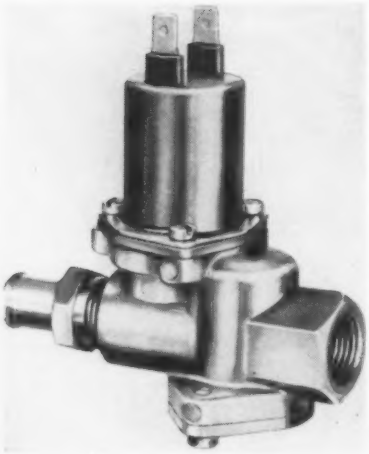
COPPER • BRASS 1801 REVERE ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

New Materials and Components



Solenoid Valve Assures Accurate Fluid Delivery

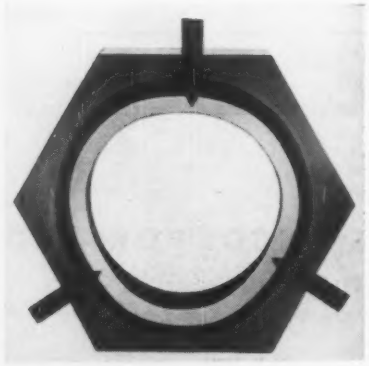
Constant water flow and accurate delivery, regardless of varying supply pressures, are provided by a solenoid valve. It has a unique flow control device built into its valve outlet connection. The valve is already in successful use in coffee and hot chocolate vending machines, as well as automatic dishwashers and water softeners. The dependable flow unit has positive opening and closing at pressures from 2½ to 200 psi. Flow capacities range from ¼ to 6 gpm. It works in temperatures up to 180°F. Special designs meet temperatures up to 200°F. The specially designed solenoid valve will positively open, positively close, time after time. Designed with flexibility in mind, it permits accurate volume control when mounted in any position. Three connections are available: pipe, tubing or hose. (Detroit Controls Div., American-Standard Corp.)

For more data circle No. 40 on postcard, p. 123

High-vacuum Pumps Work at High Speeds

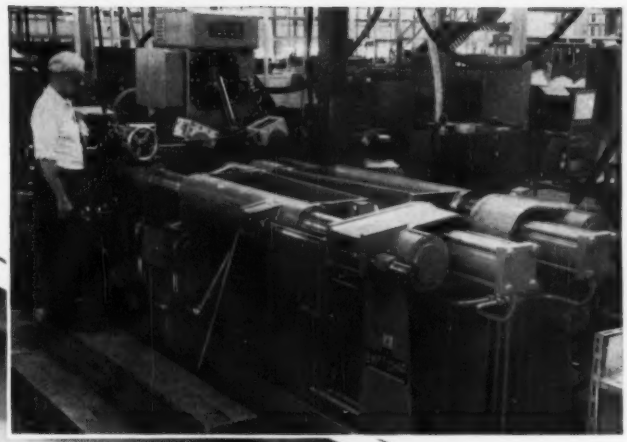
Oil diffusion high-vacuum pumps in a new line provide peak speeds up to 138 pct higher than some comparable size pumps. The 4-in. model, for example, pumps at a maximum speed of 720 liters per second over the low pressure range from 2×10^{-5} to 2×10^{-3} mm Hg. Limiting forepressure is 0.5 to 0.6 mm Hg. An immersion heater speeds vaporization by direct, internal heating of the pumping fluid. At the same time a heater assembly extension provides an additional "boost" in the vapor phase. All jet and heater parts are easily accessible for cleaning. Two models now available, a 4 in. and a 6-in. one have a range of 7×10^{-7} to 1×10^{-2} mm Hg. (Consolidated Electrodynamics Corp.)

For more data circle No. 41 on postcard, p. 123

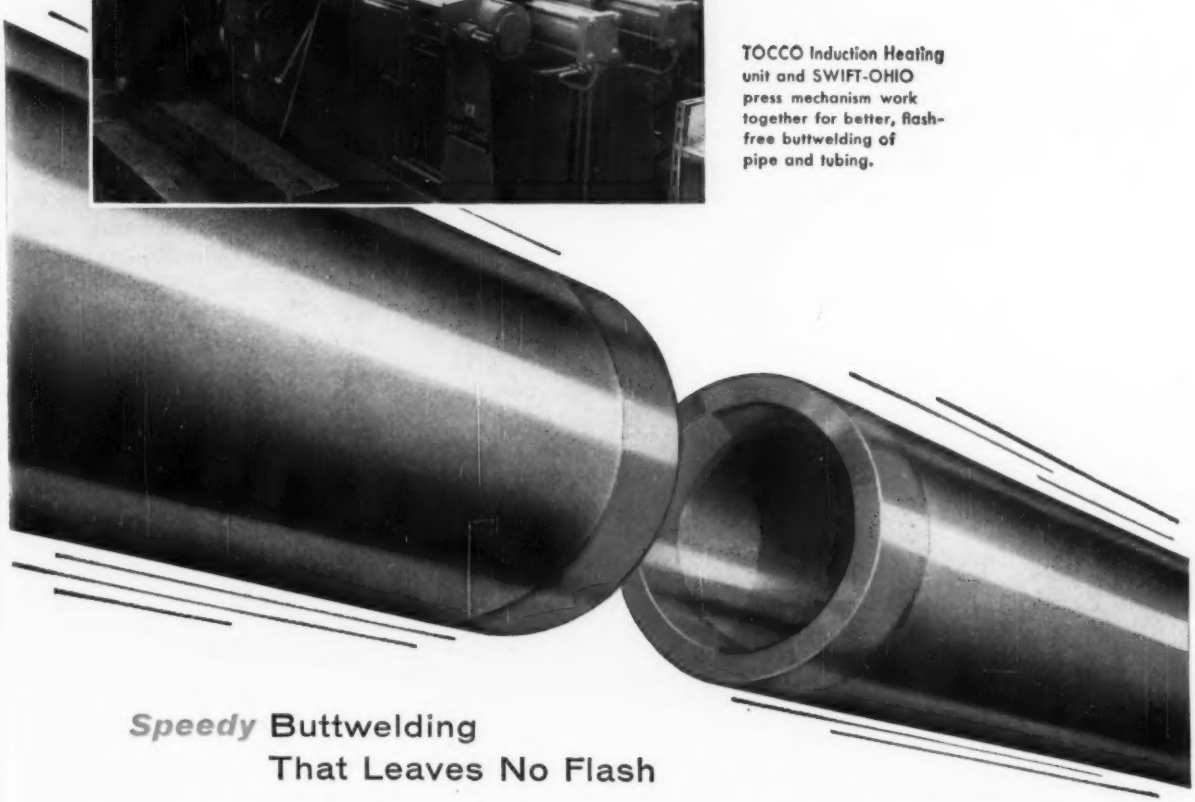


One-piece Prevailing Torque Nut Is Reusable

Of simple, one-piece design, a prevailing torque locknut is reusable. Its effective locking action results from accurate preforming of the threads in the locking section. Three sectors of the nut's tapered portion are preformed inwardly. When the nut goes on a bolt, these conforming sectors elastically return to a circular configuration. This creates an inward, downward pressure. Such pressure produces contact between the load carrying flanks of the nut and bolt threads. Resulting even-locking pressure means a locking device of high fatigue life. The fastener maintains this locking action through many re-applications. It eliminates thread injury to the mating bolt from galling, material pick-up and burrs. The locknut



TOCCO Induction Heating unit and SWIFT-OHIO press mechanism work together for better, flash-free buttwelding of pipe and tubing.



Speedy Buttwelding
That Leaves No Flash

with TOCCO* Induction Heating

and Press Mechanism by SWIFT-OHIO

Now, in less than a minute you can get flash-free, smooth joints on any size pipe, regardless of its diameter or wall thickness.

Conventional buttwelding methods produce strong, sound joints but leave a brittle flash inside or outside the pipe. Inside flash can seriously impede fluid flow. Particularly on long lengths of pipe, removal of this inside flash is a real production headache—time consuming and expensive.

Whether *your* production bottleneck involves buttwelding, soldering, brazing, heat treating or forging, it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-4, Cleveland 5, Ohio

Please send reprint of article from STEEL Magazine entitled "Buttwelder Leaves No Flash".

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Tempilstik°

*temperature indicating crayons**

*Also Tempil° Pellets and Tempilaq° (liquid form)

Tempilstik°—a simple and accurate means of determining preheating and stress relieving temperatures in welding operations. Widely used in all heat treating—as well as in hundreds of other heat-dependent processes in industry. Available in 80 different temperature ratings from 113°F to 2500°F . . . $2.00 each.

Send for free sample Tempil° Pellets. State temperature desired . . . Sorry, no sample Tempilstiks° .

Most industrial and welding supply houses carry Tempilstiks° . . . if yours does not, write for information to:

ENGINEERING SALES DIVISION

Tempil° CORPORATION
132 West 22nd St., New York 11, N. Y.

adapts to high, as well as low torque assemblies. It's particularly good for high torque stop-nut applications. (National Machine Products Co.)

For more data circle No. 42 on postcard, p. 123

Check Valve

Using relatively few parts, a new bronze swing check valve features easy maintenance and reliability. Of heavy-duty construction, it's recommended for industrial applications of steam, water, oil and gas service where back-flow must be prevented. However, it's not recommended for pulsating services. When the valve is fully open, there's

only a slight restriction to full-flow. Generally used in connection with a gate valve, it may be installed in either a horizontal or vertical position. Easy access is provided to its bronze disk for regrinding. Sizes ½, ¾, 1, 1¼, 1½ and 2 in. rate at 125-lb saturated steam, 200-lb OWG. (R-P&C valve Div., American Chain & Cable Co., Inc.)

For more data circle No. 43 on postcard, p. 123

Pressure Control

Explosion-proof and waterproof, a new high pressure control regulates air, gas or liquid pressures in hazardous locations. It's especially valuable where explosive gases or vapor are present. Pressure range extends from 10 to 1700 psi, with a proof pressure of 2500 psi and a maximum pressure of 3500 psi. Its cast iron base and aluminum cover construction permits use in Class I, Groups C & D; Class II, Groups E, F & G; Class III as defined by the National Electrical Code. Approximate weight 8 lb 7 oz. Many types of switches are available including: normally open, normally closed, or double throw with no neutral position. They rate for 15 and 20 amp at 115/230-v ac. (United Electric Controls Co.)

For more data circle No. 44 on postcard, p. 123

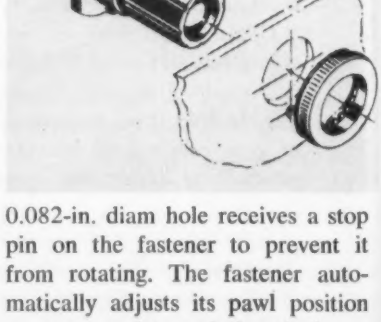
Mending Tape

Transparent and adhesive, a new tape boasts delayed setting action to facilitate accurate positioning. produced also as transparent sheets and rolls, it has a protective wax coating. When removed, this coating lets the film become just tacky enough to allow approximate positioning. Several hours later it can still be re-located. Left untouched for about 24 hours the film's adhesive "sets". It forms a permanent bond with paper or cloth. It's washable, waterproof and chemically stable. (Keuffel & Esser Co.)

For more data circle No. 45 on postcard, p. 123

Miniature Fastener

Compact and rugged, this adjustment pawl fastener eliminates rivets or bolts usually required to hold a fastener body to a door or panel. One 9/16-in. diam hole takes the fastener shaft; another



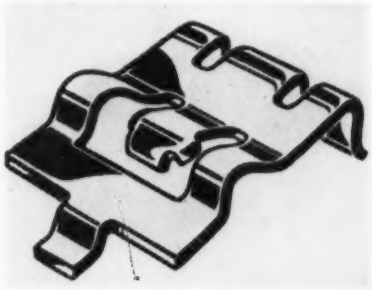
0.082-in. diam hole receives a stop pin on the fastener to prevent it from rotating. The fastener automatically adjusts its pawl position to accommodate variations in frame thickness up to ¼ in. In addition, continued rotation of the plastic

and steel knob increases applied pressure. The fastener comes in three types for frame thickness up to ¼, ¼ to ½, and ½ to ¾ in. (Southco Div., South Chester Corp.)

For more data circle No. 46 on postcard, p. 123

Cable Clip

Installed with speed and ease is a new cable clip. It secures small-diameter armored control cables on electrical, automotive or other products. The one-piece cable clip offers vibration-proof fastening at any location along the cable. Unlimited reuse is possible without damage to



cable or clip. To assemble: a small L-shaped tab on the clip inserts into a panel hole. Armored cable then is positioned between an embossed groove on the panel and a mating groove in the clip. It clamps securely in place as the clip snaps over the panel edge. (Tinnerman Products, Inc.)

For more data circle No. 47 on postcard, p. 123

Ball Bearings

Precision ball bearings now in stock have better than ABEC 7 tolerance. With bore tolerances to + zero —0.0001 in., these bearings are recommended for precise instrument assembly jobs. (PIC Design Corp.)

For more data circle No. 48 on postcard, p. 123

Aluminum Tubing

Embossed aluminum tubing, in a choice of three patterns, is the latest addition to a major aluminum producer's line. For use by "do it yourself" consumers and others, the embossed tubing can be used with present 1-in. fittings. It can be formed and cut with ordinary

STAINLESS STEEL STRIP

THROUGH SUPERB FACILITIES . . . SUPERB QUALITY and DEPENDABLE DELIVERY

What do Wallingford Steel's new facilities—a new metallurgical laboratory, Sendzimir Mill installations, and automation gaging systems—mean to you, the user?

They mean *better* flexibility in the scheduling and delivery of strip to help you schedule *your* production more efficiently.

They mean *better* stainless steel and super metals with uniform quality and gage, lustrous finish, and exceptional resistance to high heat, corrosion and wear. Our exceptionally rigid quality control—X-ray gaging for strip thickness, sensitive elongation gaging for rolling operations—and laboratory sampling of our strip before shipping, assure you stainless strip which is unsurpassed.

In summary, *the stainless steel strip you need when you need it !*

FACILITIES FOR WIDTHS UP TO 27"—THICKNESSES DOWN TO .001"—EXTREMELY CLOSE TOLERANCES MAINTAINED

Write for complete data.

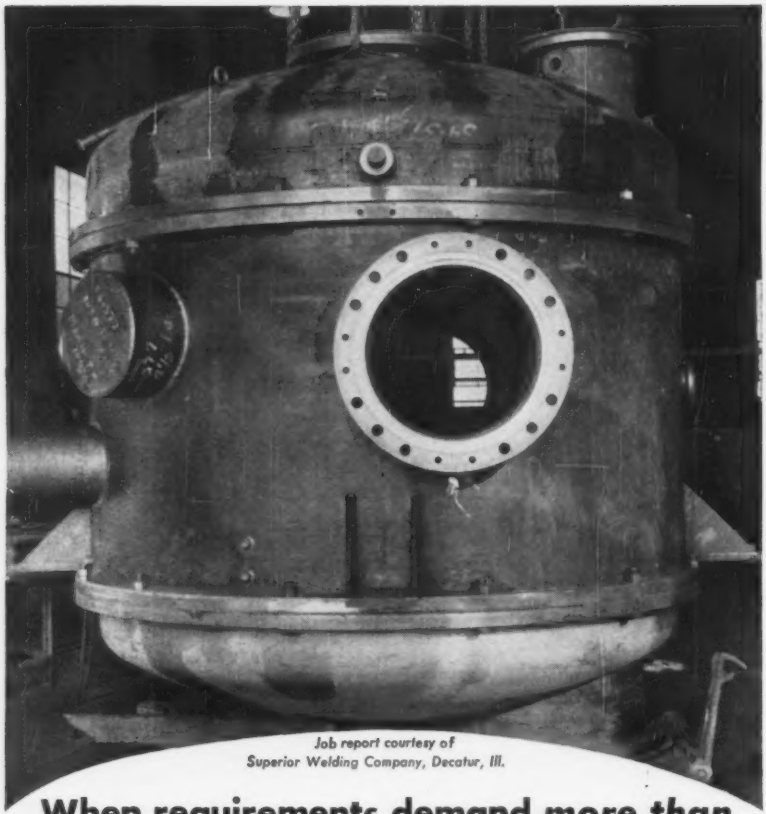
THE WALLINGFORD STEEL CO.

Progress in Metals for over 37 Years

WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*

WELDED TUBES AND PIPE: *Super Metals, Stainless, Alloy*



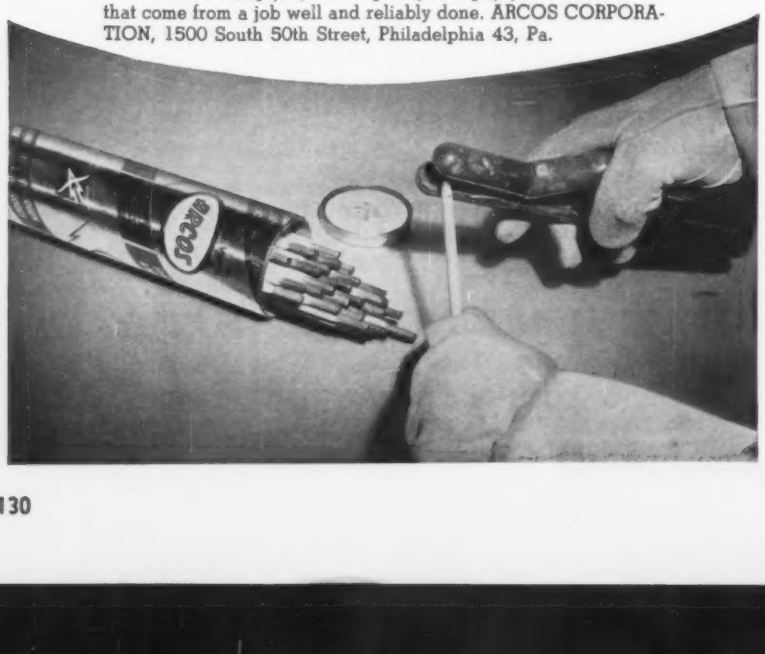
Job report courtesy of
Superior Welding Company, Decatur, Ill.

When requirements demand *more than* the "*ordinary*" in Stainless Welds

WELD WITH ARCOS

STAINLESS ELECTRODES

This vessel shell will become part of a high vacuum melting furnace. It is constructed of 304 ELC stainless steel except for supporting lugs and minor fittings of carbon steel. The stainless section was welded with Arcos CHROMEND K-LC Electrodes to assure sound, leak-free welds under high vacuum operating conditions. The chemical analysis of Arcos CHROMEND HCN proved highly successful for joining the dissimilar base metals—carbon and stainless steels. On *any* job, Arcos quality will pay you the dividends that come from a job well and reliably done. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



DESIGN DIGEST

household tools. Patterns include: an oval-in-rectangle figure, a fine hexagon pattern and a ribbed, or

fluted, design. Tubing comes in six-foot lengths. (Reynolds Metals Co.)

For more data circle No. 49 on postcard, p. 123

Door Lock

For use on truck bodies, metal cabinets, etc., this door lock spot-welds or bolts into place. Unique feature of the lock is its flush pad-

dle handle. This tells at a glance whether or not the door is securely locked. If the paddle handle protrudes it indicates the door is not securely closed. (Padl-Lok Co.)

For more data circle No. 50 on postcard, p. 123

Safety Clutch

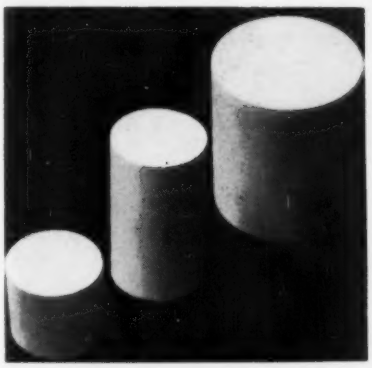
Overload protection through slippage at any preset torque up to 300 in.-lb is provided by a new safety clutch. Full drive reoccurs when torque falls below the preset value. Designed to offer safety and ruggedness without inconvenience of shear pins, the clutches are protected against accidental adjustment to positive drive. Break-away torque settings can be varied easily with a

threaded adjustor secured with a recessed lock screw. (Edgemont Machine Co.)

For more data circle No. 51 on postcard, p. 123

Ceramic Rods

High - temperature, heat - shock resistant ceramic shapes now available withstand 2200°F. They can be readily machined by the user with no further firing required. Rods, disks and custom shapes are obtainable. Rods and disks come in diameters from 9/16 to 2¼ in.

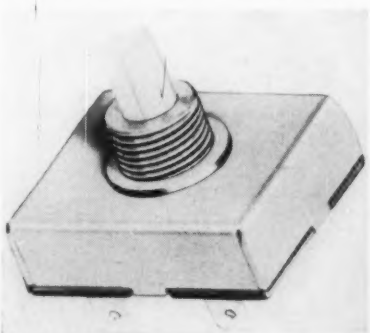


The material has a low thermal expansion rate. This lets it withstand rapid temperature changes without cracking or spalling. It's easily machinable on conventional machine tools using carbide tipped tools. (Duramic Products, Inc.)

For more data circle No. 52 on postcard, p. 123

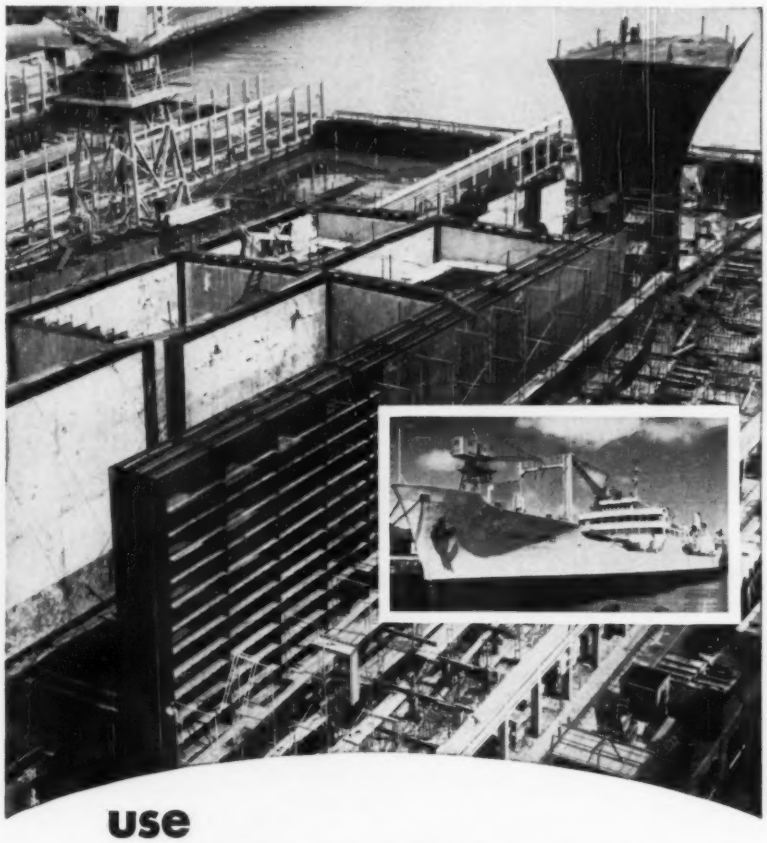
Rotary Switch

Eight combinations of 1, 2 or 3 SPST switch positions are being offered in a new rotary switch



series. Designed for appliance, vending machine and other industrial applications, the compact switch features 3/16-in. wide spade terminals with holes for solder connections, positive indexing, metal

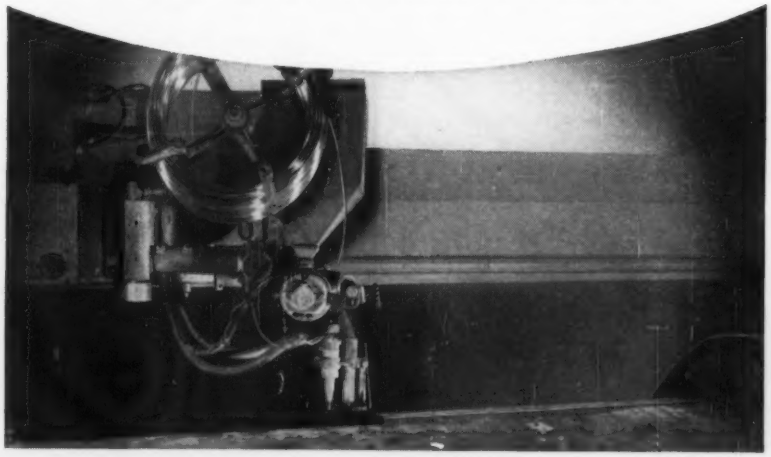
When submerged arc welding requirements are HIGHLY UNUSUAL!



use

ARCOSITE BONDED FLUX

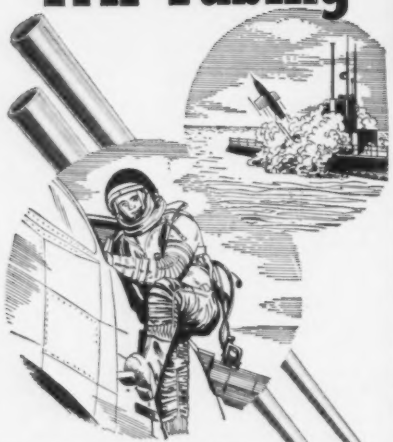
The SS Angelo Petri—the first of its kind—is a new wine tanker carrying 26 welded cargo tanks with a 2 million gallon bulk capacity. Especially unusual was the use of submerged arc welding on both sides of the type 316 stainless-clad steel tanks. ARCOSITE C-17 FLUX and Arcos CHROMENAR 25/20 bare wire were used to assure proper physical, corrosion resistant properties, and joint soundness. To control dilution on the stainless side, the clad side was automatically gouged slightly by carbon arc. Write today for information on ARCOSITE BONDED FLUXES and ARCOS STAINLESS and NICKEL ALLOY ELECTRODES. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Penna.



Space Age Specifications

Are Right In Line With The Thinking And Ability That Marks The Quality Of

TMI Tubing



We set these custom standards long before interplanetary dreaming reached its action stage: For Stainless Steel and Special Alloy Tubing cold drawn with infinite accuracy to .050" to 1.250" O.D. with tolerances as close as .0005" when you need it . . . you can depend on TMI to deliver as promised . . . so you can keep your promises, too.

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TUBE METHODS INC.

METALLURGISTS • ENGINEERS • MANUFACTURERS

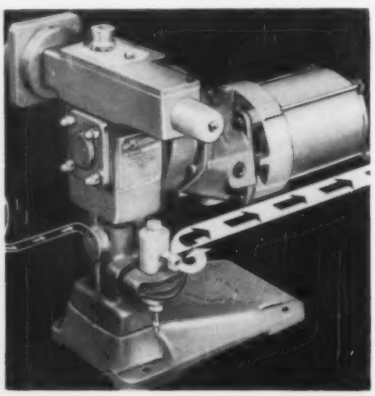
BRIDGEPORT (Montgomery County), PA.

cover and a molded nylon shaft and cam. Listed by Underwriters' Laboratories, Inc., the unit rates at 10 amp, 125-v ac; ⅓ hp, 125/250-v ac. (Controls Co. of America).

For more data circle No. 53 on postcard, p. 123

Metering Pump

Automatically metering while pumping, this compact, packless pneumatic stroke controlled unit proportions chemicals to any main line flow. The pump maintains a constant discharge in proportion to the main line flow. Operating on a

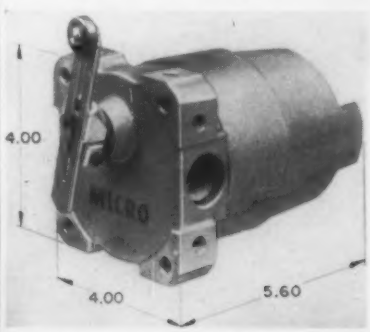


3 to 15-psig air signal, the versatile unit requires no additional power source of air. It responds instantaneously, eliminating backflash, keeping chemical discharge to flow ratio precisely accurate. (Hills-McCanna Co.)

For more data circle No. 54 on postcard, p. 123

Rugged Switches

Rain-tight and explosion-proof new switches are designed for use



on fuel or chemical handling devices, missile launching equipment and other hazardous outdoor installations. Switches are Underwriters' Laboratories listed for use in Class I (vapor-air mixtures) Groups C and D; Class II (dust-air mixtures) Groups E, F and G. Electrical capacity is 20 amp, 125, 250 or 460-v ac. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For more data circle No. 55 on postcard, p. 123

NEW BOOKS

"Plastic Design of Steel Frames" by L. S. Beedle, Lehigh University, treats basics of plastic theory. It covers shear force, axial force, buckling, and building joints (welded, bottled, riveted). 406 pp. $13 per copy. John Wiley & Sons, Inc.

"How & Where to Look It Up" is a directory of sources of information on everything. 736 pp. 3900 reference sources. 10,000 master entries. $15 per copy. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

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- Unusually long, rigid slide of unique design prevents deflection of ways, solidly supports dies and extends their life.
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- Modern, rigidly supported gearing runs in sealed oil bath for long life.
- Simplified control for safer, time-conserving press operation.
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Look at the range: 14 sizes, geared and non-geared, shaft diameters 1¼" to 7½", capacities 5½ to 250 tons.
Niagara Machine and Tool Works, Buffalo 11, N. Y.

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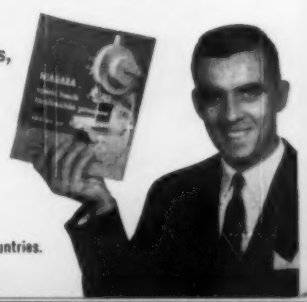


DISTRICT OFFICES: Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia / Distributors in principal U.S. Cities and major foreign countries.

New Equipment and Machinery

Production Press Stamps 3000 Items A Minute

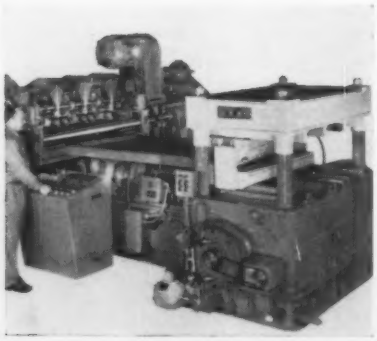
No experimental model, this actual production-line press works at 1000 strokes a minute. The 25-ton unit (using a triple-cavity die) stamps out 3000 retaining rings or other fastening devices each minute. It handles a variety of sizes and shapes. Key feature of the ultra-high speed machine is a unique counterbalancing system. This works in opposition to the force frequencies set up by the slide and, in effect, nullifies them. Thus, it holds down vibration. The press has a ½-in. stroke, with solid connections, and a 1-in. bolster adjustment. Bed opening is 16-in. right to left; it's 5-in. front to back. Bolster plate area is 12-in. front to back; 20-in. right to left. An electric clutch permits rapid torque pickup and extremely quick stops. In a typical operation, at Waldes-Kohinoor, Inc., Long Island City, N. Y., the press takes 0.050-in. thick 3-in. wide strip at a feed rate of 500 ipm. (E. W. Bliss Co.)

For more data circle No. 57 on postcard, p. 123

Audio-Visual Unit Speeds Training of Workers

Think it takes too long to break in new workers? Or too long to teach established employees new jobs? If so, you can speed things up with this audio-visual unit. On complex assembly work it cuts training periods up to 50 pct, says its manufacturer. Easy and relatively inexpensive to use, the unit synchronizes a color slide projector with a customized tape recorder. Not only does it eliminate lengthy training periods; it also may cut supervisory instructors' time by 80 to 90 pct. Yet, each trainee receives the equivalent of 100 pct guidance. A trainee determines his own learning pace too. He controls sequences with a stop-start-repeat feature that lets him go through any step-by-step assembly process at his optimum speed. When a change in assembly procedure is necessary, it's done simply by substituting a new slide and re-recording the corresponding part of the tape. (Lear, Inc.)

For more data circle No. 58 on postcard, p. 123

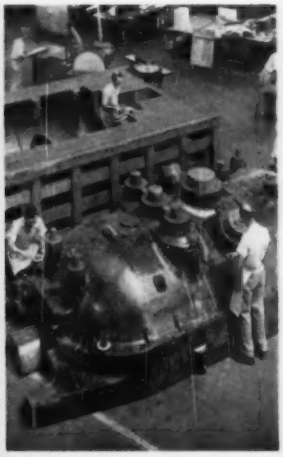


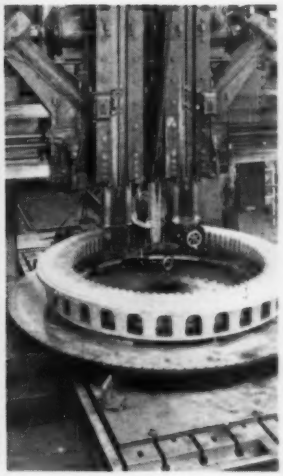
Shear Rapidly Adjusts to Changes in Lengths

Instantly, this electronic-run die shear setup adjusts to orders for length changes of sheet being sheared. Such rapid, accurate adjustment is done without a skilled operator, too. An unskilled worker merely punches out the desired length on a keyboard; the machine does the rest. Compare this with 5- to 30-minute changeovers with some other setups. The machine runs at 200 fpm at 1/32-in. accuracy. It uses simple alternating-current drives and control. What's more, if desired, complete automation can be used; controls adapt to standard data "punch cards," punched tape or other programming equipment. (McKay Machine Co.)

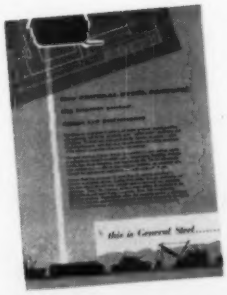
For more data circle No. 59 on postcard, p. 123

...where industrial progress is cast in steel





PRODUCTION FACILITIES... COMPLETE AND MODERN



Write for folder: **How General Steel Castings Can Improve Product Design and Performance.** General Steel Castings, Station 201, Granite City, Illinois.

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NEW EQUIPMENT

Thickness Gage

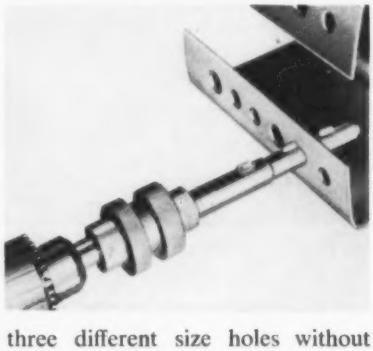
A new electronic-optical instrument measures thickness of sheet, foil or webbing of any width or material. It uses a principle similar to sighting of distant landmarks on

cross-hairs of surveying telescopes. The gage measures automatically. It requires no visual observation. Optics are self-contained in a rugged housing from which electronic connections are brought out. Because of the principle used, the gage is not a comparator and requires no standards of calibration. Operation is very simple; it can be done by untrained operators. The meter scale comes in several accuracies and sensitivities depending on tolerance involved. Normally, each scale division corresponds to 1/10,000 in. Physical properties of material (i.e., dielectric constant, conductivity, absorption of radiation) aren't involved in measurement. The thickness gage is virtually maintenance-free. It's unaffected by material speed of flow. Non-contacting, it clears the material by 1 in. or more for easy insertion. (Projecto-Graph Instrument Co.)

For more data circle No. 60 on postcard, p. 123

Deburring Tool

This special tool has three separate pilot diameters and a cutter blade with three correspondingly positioned cutting heads. Used in a portable drill-motor, it deburrs the front and back hole faces of



three different size holes without separate tool changes. As a safety feature, passage of the tool through to the working hole surface is made with cutter retracted. (Nobur Mfg. Co.)

For more data circle No. 61 on postcard, p. 123

Drill-Reamer Sharpener

A new sharpening fixture simply, accurately sharpens single and multiple-flute gundrills, gun-type reamers and conventional reamers. Mounted on a conventional tool grinder, it lets an operator quickly, precisely, position the tool for sharpening compound-angle surfaces. Six different setup gages and

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Complete line. We can furnish knives of correct analysis, including carbide, to slit any ferrous or non-ferrous material. For quick, accurate set-up and clean, sharp cuts, specify "Cowles", world's largest manufacturer of Rotary Slitting Knives.

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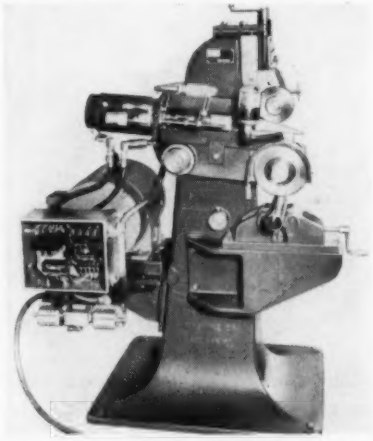
COWLES

bushing clamps for ½, ¾, 1, 1⅜, 1¾ and 2¼-in. OD bushings are provided with the fixture. Three different tail centers cover this range of bushing sizes. (Star Cutter Co.)

For more data circle No. 62 on postcard, p. 123

Cutoff Machines

Rotary pipe and tube cutoff machines have hydraulic power checks. The machines handle small, light gage tubes plus heavy-wall pipe up to 12¾ in. OD. Machines have JIC electronic and hydraulic components. Thin wall tubing can be

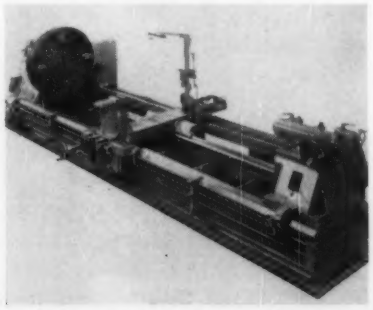


cut without a toe-in of the cut edge. The hydraulic power check achieves a smooth cutting stroke by keeping the exact uniformly regulated cutting pressure on the wheel and work. (Continental Machine Co.)

For more data circle No. 63 on postcard, p. 123

Large Lathe

For large parts requiring precision, new lathes have swings up to 72-in. Centers distances range up



to 50 ft. Lathes come either with or without a fluid tracer. Among their features is a 16-spindle-speed headstock with lapped herringbone gears. This type gearing provides smooth operation, considerable tooth contact, balanced gear loads, and long gear life. Headstock bearings are precision taper roller type. For thread and feed changes 60 ratios are standard. For infinitely variable speeds, the lathes are available also with direct-current motor drive. (Sidney Machine Tool Co.)

For more data circle No. 64 on postcard, p. 123

Tool Storage

Tool storage equipment produced by one maker now includes new standard tool shelving. The shelving features: (1) Flexibility. It can be tailored and re-tailored to fit changing requirements; (2) Ease of assembly. No tools are necessary. (3) A complete line of tool storage inserts and shelving accessories. The toolroom equipment provides a place for everything, with everything in its place. (Lyon Metal Products, Inc.)

For more data circle No. 65 on postcard, p. 123

Driller-Tapper

Fully adjustable, a new four-spindle drilling and tapping head is compact and lightweight. It handles delicate production jobs. Small and easy to handle, it eliminates using larger, more expensive, even cumbersome, adjustable heads on smaller work. Operating in any position, it works on any drill press, drilling or tapping unit or machine. It either drills or taps from 2 to 4 holes ranging from 1/32 to ¼-in. in steel. (Ettco Tool & Machine Co., Inc.)

For more data circle No. 66 on postcard, p. 123

Steel Strapper

This pneumatic stretcher with shear features use of heavy-duty steel strapping direct from the coil. It combines airpowered tensioning and manual cutting of strap into one tool. The stretcher tensions ¾-in. strapping. After sealing, strap is sheared close to the seal. The tool then is removed from the

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NEW EQUIPMENT

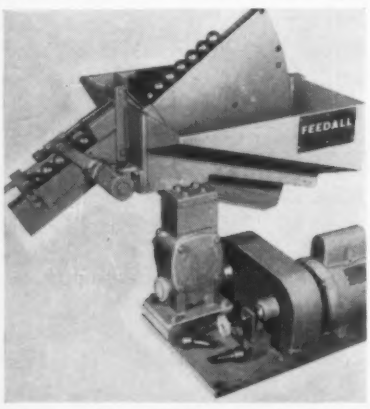
strap. It eliminates strap waste with the direct-from-coil feed, has a high speed strap take-up, and provides exceptionally high residual strap tension. Light in weight, it's easy

to thread and convenient to operate. Predetermined tension is applied simply by pressing the throttle, reducing operator fatigue sometimes associated with manual tensioning. (Acme Steel Co.)

For more data circle No. 67 on postcard, p. 123

Parts Feeder

Automatic and continuous feed, transfer or assembly of headed parts are provided by this feeder. It has electric control with variable speed from 10 to 20 strokes per



minute. The machine feeds ⅛ to 1-in. diam sliding parts from 1 to 4-in. long; headed work, same diameters, ½ to 3-in. long. Hopper capacity is 1½ cu ft. The feeder is readily portable. It measures only 18 x 28-in. over-all, 19-in. high. Power is entirely self-contained. It uses a ¼-hp 220/440-v 3-phase motor. Many flexible features, including automatic bank control devices, are available without special designs. A built-in overload safety system protects moving parts from damage. (Feedall, Inc.)

For more data circle No. 68 on postcard, p. 123

Welder, Powerplant

Gasoline engine driven welder-powerplants now are offered with optional electric starters. The new units are powered by a 12-v battery with a Bendix drive automotive type

starter. A 12.9-hp engine and other components combine to deliver 225 amp ac welding current on 100-pct duty cycle. (Miller Electric Mfg. Co., Inc.)

For more data circle No. 69 on postcard, p. 123

Air Tool

With considerable power and speed, this air impact tool handles heavy-duty nut running jobs. It tightens or removes nuts on bolts

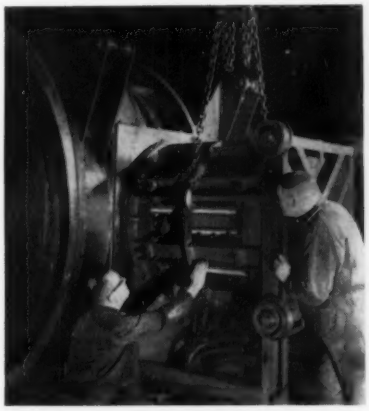
from 6 to 12-in. diam. With a free speed of 330 rpm, the wrench delivers 500 blows per minute while impacting. "The tool has four times

the slugging power of any other wrench on the market," says its maker. Handled by a hoist or crane, it's designed for easy positioning with an eye-bolt suspension for either vertical or horizontal use. (Ingersoll-Rand Co.)

For more data circle No. 70 on postcard, p. 123

Electric Furnace

For zinc processes, this electric furnace now being built rates at 300 kw. Designed to operate at about 1000°C, it will have a capacity of 5 long tons. The need for



a converter to step up power from mains frequency to high frequency is claimed eliminated, and the capital cost of plant is expected to be halved. (Birlec-Efco Melting Ltd.)

For more data circle No. 71 on postcard, p. 123

NEW FILMS

"Sinews of Steel" is a television show including dramatic sequences on refining via vacuum and by oxygen, automatic milling, and alloying. Products covered range from horse shoes to ballistic missiles. $35. Arthur Lodge Productions, Inc., 21 W. 46th St., New York 36.

"Expanded Service to the Electrical Industry" deals with high-voltage power equipment. It shows testing, operation and manufacture of this equipment with some quite spectacular scenes. 25 min. 16mm, color, sound. Delta-Star Electric Div., H. K. Porter Co., 2437 Fulton St., Chicago 12, Ill.

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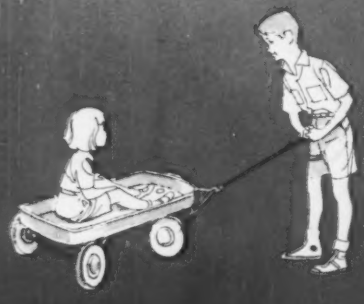

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The Iron Age Summary

Mills Lag on Delivery Promises

Major carryover problems loom in galvanized sheet, hot- and cold-rolled sheet.

Steel users are pressuring mills for delivery on schedule. But the situation is expected to worsen in the weeks ahead.

▪ Steel mills are falling behind on their delivery promises. This is a serious matter for steel users who have been counting on every pound they can lay their hands on as a hedge against a possible steel strike.

Mill deliveries are growing increasingly late. Major carryover problems are in galvanized sheet, hot- and cold-rolled sheet and plate. Hot-rolled bar is developing into a trouble spot at a fast clip.

Pressure Is On—Steel users are bringing more pressure to bear in an effort to speed up deliveries. But the situation is expected to worsen in the weeks ahead.

Compounding the problem is the fact that the business of some steel users is so good that incoming tonnages are just enough to keep pace with increased use. For these outfits, steel stocks are rising slowly, if at all.

Warehouses Feel Effect—Some mills have done a good job of maintaining delivery promises, but even for these producers there will be some carryover into the critical month of June and a possible strike deadline.

As a by-product of this situation, more companies are turning to steel service centers (warehouses) for fill-in tonnages they would normally get from the mills. This, in turn, is placing a strain on the inventories of the service centers, particularly in sheets.

What Survey Shows—An IRON AGE survey of service centers (see page 63) indicates they will be able to help some if a pinch comes. By July 1, warehouse stocks will be 3.6 to 3.7 million tons. This would be about a million tons better than at the start of the 1956 steel strike.

But the service centers have problems, too. They must take care of their regular customers. Their stocks are not necessarily balanced. They might have eight months' supply of one product and be all but cleaned out of another. Too many mill-size orders could cut service center inventories quickly.

Long Look Ahead — Generally speaking, the warehouses could sustain their regular customers through a 60-day strike, assuming they will be able to get delivery from the mills of all the steel they have ordered.

Meanwhile, fear of a strike is forcing more steel users to place orders for July delivery. Naturally, if there is a strike the mills won't be in a position to deliver during July. But the buyers are looking ahead to a strike settlement. They want to have their orders on the books for quick delivery after a strike ends. Among these companies are some of the biggest consumers, including automotive.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,689	2,661	2,632	1,270
Ingot Index				
(1947-1949=100)	167.4	165.7	163.8	79.1
Operating Rates				
Chicago	95.0	95.0	95.5	55.0
Pittsburgh	97.0	95.5	95.0	47.0
Philadelphia	94.0	95.0*	97.0	59.0
Valley	90.0	91.0*	86.0	34.5
West	92.0	93.0*	88.5	69.0
Cleveland	97.5	96.0*	96.0	29.0
Detroit	101.0	99.0*	99.0	13.0
Buffalo	105.0	105.0	105.0	37.0
South Ohio River	98.0	94.0*	95.0	29.0
South	93.0	95.0	89.0	54.0
Upper Ohio River	97.0	90.0*	98.0	57.5
St. Louis	98.0	97.0*	85.0	64.0
Aggregate	95.0	94.0	93.0	47.1

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$34.83	$35.17	$40.50	$31.83
No. 2 bundles	$23.17	$23.17	$27.83	$23.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.10
Copper, electrolytic	31.50	31.50	31.50	25.00
Lead, St. Louis	11.30	10.80	11.30	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.00	102.25	102.75	93.00
Zinc, E. St. Louis	11.00	11.00	11.00	10.00

Watch Your Portable Tool Costs

Probability of increased raw materials costs may mean higher portable tool prices.

Delivery is still off-the-shelf for standard tools. Many new products are coming.

▪ There are two good reasons, maybe three, to expect that prices of portable tools will go up this summer.

Costs of steel and aluminum, two major materials used in portable tools, will in all probability be increased. And if the copper unions strike for higher wages this summer, a price increase may also be coming for that material. Copper is used extensively in electric portable tools.

Wait and See — At this stage, most portable toolmakers are noncommittal about price increases. Even in boom years, the portable tool market is highly competitive.

One major producer of pneumatic tools which boosted its prices between 5 and 15 pct last November winces at the prospect of inflicting another increase on its customers so soon.

"We will have to look over our entire line on a tool-by-tool basis," said a sales executive. "We will boost our prices only where we absolutely have to."

Some May Absorb Increase — Another major producer of electric tools hinted that it, too, might absorb some of the anticipated higher costs of materials. "No price increases are scheduled at present," a company spokesman said, "But with the knowledge that an increase in the cost of raw material is pending, a reconsideration of this schedule may be necessary."

Working to the tool companies' advantage will be the "inflation psychology" prevailing in the market. Most buyers are resigned to the fact that a steel price hike will mean increases in the prices they pay for many goods.

Slight Backlogs—Generally, portable tool sales are up compared to the same period last year. But backlogs are reported only in the special tools category, such as multiple nut setters, broaching equipment.

Delays of from 4 to 7 weeks can be expected for special items, but look for these backlogs to be reduced within the next three months. For standard portable tools, deliveries in practically all instances can be made from stock.

New Products Buffer—Another factor that should help ease the pain of higher prices will be the new products most tool producers will introduce next fall. Tool designs change almost as frequently as automobile models. It's easier to tack a higher price on a new product than an existing one.

There is hardly a tool maker in business who hasn't got a few new tools on the boards for introduction later this year.

Tool Care Important — Higher prices do not necessarily mean that a company's portable tool outlays must be higher. Leading tool companies stress that a well-organized maintenance program can extend tool life up to five years and longer.

POPULAR TOOL: Portable broach gun made by Chicago Pneumatic is a big seller, company says. The tool speeds up hole finishing in rivet pull gun production. Broaching operation quickly converts round holes to square carriage bolt holes that are accurately sized and positioned.

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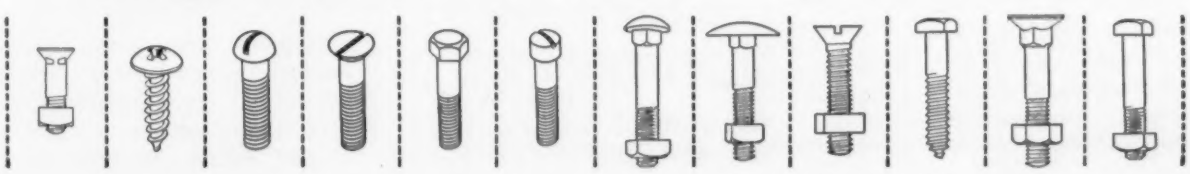

Second Half Outlook For Heavy Steel

Plate and structural mills are not discouraged about sales prospects after June.

Steel earmarked for inventories is being used up.

Also encouraging: Freight car building and construction work.

■ Heavy steel producers don't expect their market to fall apart after June if there's no steel strike.

Right at the moment plate and structural bookings for July and later months are light. But the mills are not discouraged.

Plate producers are encouraged because buyers find it necessary to divert tonnage bought for stock to production use. "At first we estimated 50 pct of the ordering was a strike-hedge," says an East Coast mill man. "Now we think that estimate was much too high."

Midwest plate mills predict some users will reach July 1 with less than 60-day inventories. In some cases stocks may run as low as 45 days. These buyers will clearly be back in the market soon—if there's no strike.

Also encouraging plate producers is the rise in demand from fabricating shops. These users, too, were trying to build inventories until better business curtailed their efforts.

Structural mills are worried about some letdown in the July-September period. But they fear no sales collapse. Counted on to help out in the second half: Freight car building programs and construction activity.

Sheet and Strip—Delivery delays and mill carryovers are the big news, with order books closed out for the first half. One automaker is described as anxiously looking for more cold-rolled sheet for May and June delivery. Another isn't increasing orders, but will build inventory less than expected because of production needs.

Due to minor schedule adjustments some **Pittsburgh** mills still have June tonnage to offer. But this trend isn't general. At **Cleveland,** carryovers and last minute requests for extra tonnage have put most mills behind on deliveries. Delivery delays are also plaguing **Detroit** area customers.

Sheet mill carryovers at **Chicago** are running from three to six weeks. Some sheet users, caught with short inventories, are canvassing service centers to fill their needs. Hot- and cold-rolled strip mills there are running at capacity with increasing backlogs.

Bar—Demand for May and June tonnages of hot-rolled bar will probably exceed mill producing capacity. However, at the moment, some Pittsburgh mills are not sold out for May. And, as yet, they do not have firm orders for all June tonnage.

Auto forging plants at **Cleveland** are getting little chance to build up bar stocks. Because of order increases from their customers they are pressing mills for additional bar tonnage, often without success. Orders for alloy and stainless bars continue strong.

Pipe and Tubing—Producers of standard pipe are still waiting for an expected wave of strike buying. One mill sales official on the **East Coast** predicts the jobbers there won't build stocks as much as expected. "Business isn't that good," he says, "and the money to accumulate stocks apparently isn't available." Oil country seamless orders are good through June. After that the market is expected to sag.

Iron Ore Prices—Ore prices remain unstable with the possibility of some increases after the steel wage situation is settled. Right now, iron ore producers are labeling current prices as "temporary" and "subject to change later."

Stainless — Shipments of most products are rising. Stainless strip for automotive use is not showing the same spurt as some other items. But demand is good. Orders for alloy steel are heavy and some defense priorities are being used.

Inventory Viewpoint—There was no extensive build-up in steel inventories in fourth quarter '58, except for buying of flat-rolled steel by the appliance industry. That's the opinion advanced in a new study by Herman B. Director Associates, Washington. Adds Mr. Director: "It looks as though orders for inventory were placed too late. It would be virtually impossible for the mills to ship enough steel by June 30 to rebuild consumer inventories back to last year's levels."

Woodward Strike Ends—Operations have resumed at the Woodward Iron Co. plant near Birmingham, Ala., following a 21-day "wildcat" strike by the USW local.

PURCHASING AGENT'S CHECKLIST

IRON AGE Survey shows service centers could carry customers through a 60-day steel strike. P. 63

Packaging redesign can save you money. P. 66

Steel warehouses mechanize to serve customers better. P. 101

COMPARISON OF PRICES

(Effective April 21, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Apr. 21 1959	Apr. 14 1959	Mar. 24 1959	Apr. 22 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	6.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloys blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

	Apr. 21 1959	Apr. 14 1959	Mar. 24 1959	Apr. 22 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.48
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$38.50	$38.50	$43.50	$32.50
No. 1 steel, Phila. area	33.50	33.50	37.50	35.50
No. 1 steel, Chicago	32.50	33.50	40.50	27.50
No. 1 bundles, Detroit	*31.50*	32.50	34.50	21.50
Low phos., Youngstown	*38.00*	40.50	44.50	32.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	48.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	47.50
No. 1 mach'y cast, Chicago	*51.50*	53.50	54.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$34.83	$35.17	$40.50	$31.83
No. 2 bundles	23.17	23.17	27.83	23.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	31.50	31.50	25.00
Copper, Lake, Conn.	31.50	31.50	31.50	25.00
Tin, Straits, N. Y.	*102.00*†	102.25	102.75	93.00
Zinc, East St. Louis	11.00	11.00	11.00	10.00
Lead, St. Louis	11.30	10.80	11.30	11.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Are Scrap Prices Leveling Off?

Bulletin

The IRON AGE No. 1 heavy melting Composite Price dropped 33¢ to $34.83 on a late purchase by a Chicago area mill.

▪ It may be the bottom. Or it may be a false bottom.

After dropping steadily for two months, openhearth scrap prices showed a tendency to level off this week.

Many seasoned scrap men believe that scrap prices today are low enough to compete with hot metal. But mill buying is still confined to limited tonnages, even though the operating rate is at 95 pct.

There is little doubt that the steel labor outlook is affecting mill scrap-buying policies. As the June 30 strike deadline draws nearer, the less willing the mills will be to buy scrap.

The result is a sluggish scrap market. Flow of scrap into and out of dealer yards has slowed to a trickle. Even industrial scrap, now being generated at a high rate, is having trouble finding a home.

If current prices are attractive to the mills, as some say, there is still time enough for a scrap-buying splurge. But no one is offering odds that this will happen.

In the face of mill apathy, The IRON AGE No. 1 heavy melting Composite Price dropped 33¢ to $34.83.

Pittsburgh — The market here continues quiet and weak. One local mill bought No. 1 bundles at $39 and $41—No. 2 dealer bundles at $25 and $27. For No. 1 bundles the top price represented a drop of $1. For No. 2 bundles the top price confirmed existing levels. Local yards were reported to be slow in accepting orders for No. 2 bundles at the lower price. The tonnage involved is not large enough to put any steam in the market. Scrap men have almost given up hope that this quarter will see the kind of determined buying needed for a strong market.

Chicago—This market continues to slump despite new purchases by users of electric furnace and railroad grades. Cast prices varied widely, but in the immediate area they slipped slightly as foundrymen stepped up use of steel scrap in their melt. Mills continue to move the price down on small lot purchases scattered among a number of suppliers. The price of railroad steel car axles was misprinted in the issue of Apr. 16. Correct price should have been $65-$66.

Philadelphia — A district mill came into the market for limited tonnages of heavy melting scrap at existing prices. But the market is still weak. There is plenty of material available to dealers—both industrial and from collectors. No one is anxious to buy.

New York—This market continues slow. No. 2 bundles and turnings are off $1 in view of lack of orders. Brokers and dealers are beginning to resign themselves to very little business until the strike picture clarifies.

Detroit—Aside from shipment on old orders, the market is dormant. Dealers and brokers are waiting for industrial lists to close early next week. Industrial grades are expected to bring $2 to $3 under April lists, although dealers anticipate a smaller drop for themselves.

Cleveland—Market dropped $2.50 in local and Valley market on prime grades as mill apathy continues. A few mills are showing a spark of interest, however. Jockeying on auto lists indicates another drop-off coming.

St. Louis — Flow of scrap into dealer yards was at a standstill last week. Most prices are unchanged and the bottom may have been reached. Railroads have withdrawn several offerings because of the depressed prices.

Birmingham—Despite slowness of the market, dealers continue to hold on to most of their higher-priced scrap, filling orders with recent purchases at lower prices. As a result, brokers have to contact more dealers than usual to fill their orders.

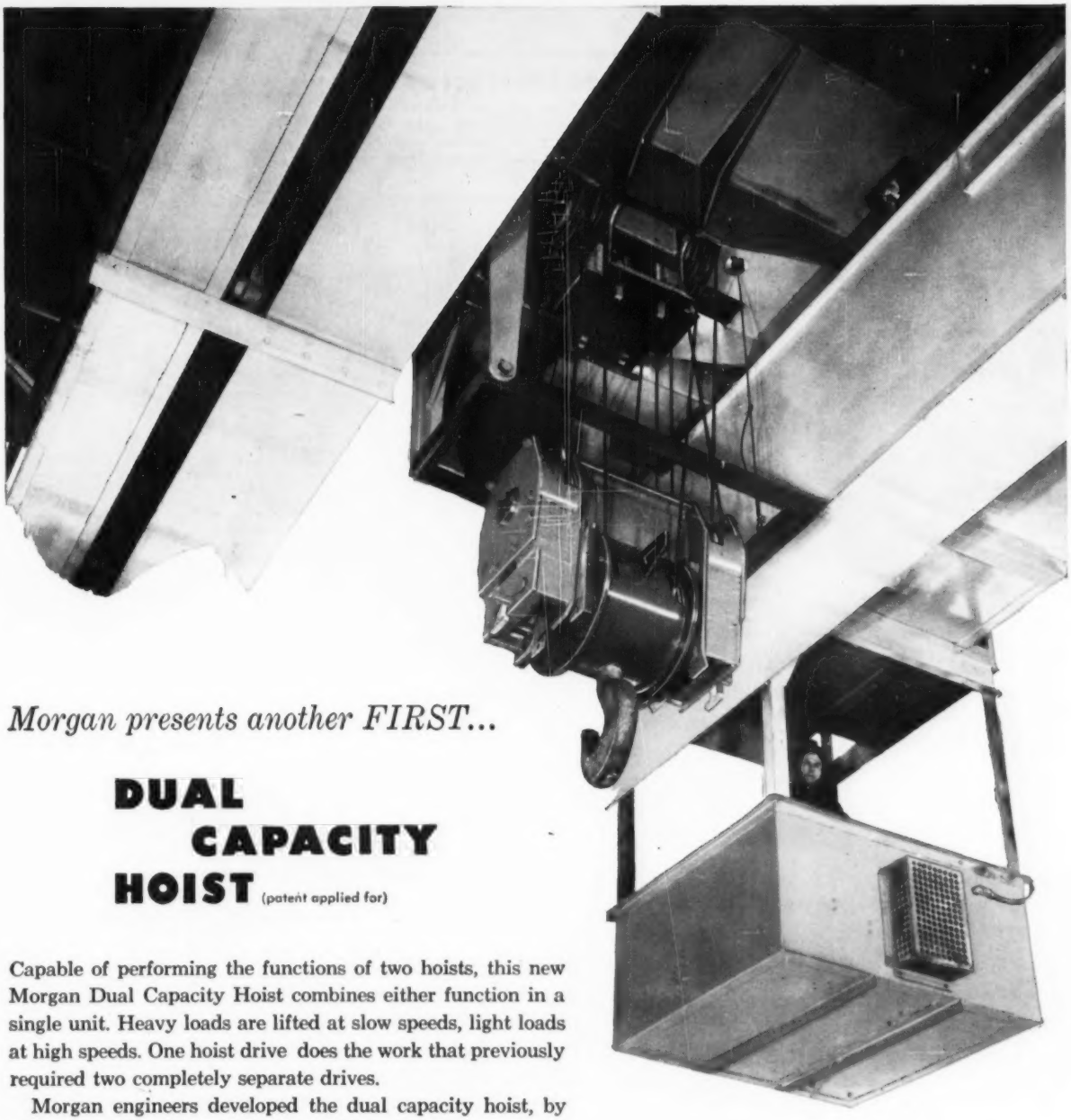
Cincinnati—Market here is holding its own but weakness is infiltrating from other areas. One mill is expected to buy next month. Otherwise, no new business is expected. Tonnage on old orders is moving on the river.

Buffalo—No. 1 and No. 2 items are off $2 on basis of a sale. Turning items are off $1, as is cast iron. Railroad items, low phos, and structurals are off $2. The sale at mid-month came as a surprise to dealers.

Boston — The market is quiet. Lack of business in recent weeks has lowered dealer morale.

West Coast—Mill inventories are reported highest ever. Flow of scrap is good. Exporting continues active. Most of the scrap needed for export is on the docks waiting to be loaded.

Houston—The local mill's offer to buy a small amount of scrap beginning May 15 weakened the market. Prices of No. 1 and No. 2 heavy melting dropped $2. Causing further dismay is a proposal in the state legislature to levy a 5 pct gross receipts tax on the scrap industry.



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Capable of performing the functions of two hoists, this new Morgan Dual Capacity Hoist combines either function in a single unit. Heavy loads are lifted at slow speeds, light loads at high speeds. One hoist drive does the work that previously required two completely separate drives.

Morgan engineers developed the dual capacity hoist, by separating the hook block into two parts and altering the rope reeving through them. The shift from low to high speed hoisting is done quickly by mechanically separating the dual block and disengaging a portion of the reeving. On a given hoist, reeving can be modified to provide 2:1, 3:1 or 4:1 ratios.

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SCRAP PRICES *(Effective April 21, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. punch'gs plate	44.00 to 45.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	56.00 to 57.00
RR specialties	47.00 to 48.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	130.00 to 135.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	44.00 to 45.00
Low phos. punch'gs plate, ¼ in. and heavier	41.00 to 42.00
Low phos. 2 ft and under	39.00 to 40.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	51.00 to 52.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	63.00 to 64.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	48.00 to 49.00
Malleable	54.00 to 55.00
Stove plate	41.00 to 42.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	17.00 to 19.00
Mixed bor. short turn.	17.00 to 19.00
Cast iron borings	17.00 to 19.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft punch'gs	41.00 to 42.00
Elec furnace bundles	38.00 to 39.00
Heavy turnings	32.00 to 33.00
RR specialties	42.00 to 43.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	41.00 to 42.00
Rails, random length	47.00 to 48.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$36.50 to $37.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	36.50 to 37.50
No. 2 bundles	21.50 to 22.50
Machine shop turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Low phos. plate	37.50 to 38.50

Cleveland

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	33.00 to 34.00
Low phos. punch'gs plate	34.00 to 35.00
Foundry steel, 2 ft & under	35.00 to 36.00
No. 1 RR hvy. melting	38.00 to 39.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Steel axle turnings	24.00 to 25.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	66.00 to 67.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	32.00 to 33.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	17.00 to 18.00
Low phos. plate	37.00 to 38.00
Structurals and plate 2 ft and under	41.00 to 42.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 cupola cast.	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	19.00 to 20.00
No. 1 RR hvy. melting	38.00 to 39.00
Rails, random lengths	46.00 to 47.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	45.00 to 46.00
RR specialties	42.00 to 43.00
Cupola cast	49.00 to 50.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	44.50 to 45.50
Cast iron car wheels	41.00 to 42.00
Rerolling rails	57.00 to 58.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	40.00 to 41.00
Structural and plate, 2 ft.	39.00 to 40.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
Angles and splice bars	43.00 to 44.00
Rerolling rails	52.00 to 53.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean chem. cast. borings	23.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	30.00 to 31.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast.	33.00 to 34.00
Mixed cupola cast.	42.00 to 43.00
Automotive cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	$32.00 to 34.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy melting	$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	18.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

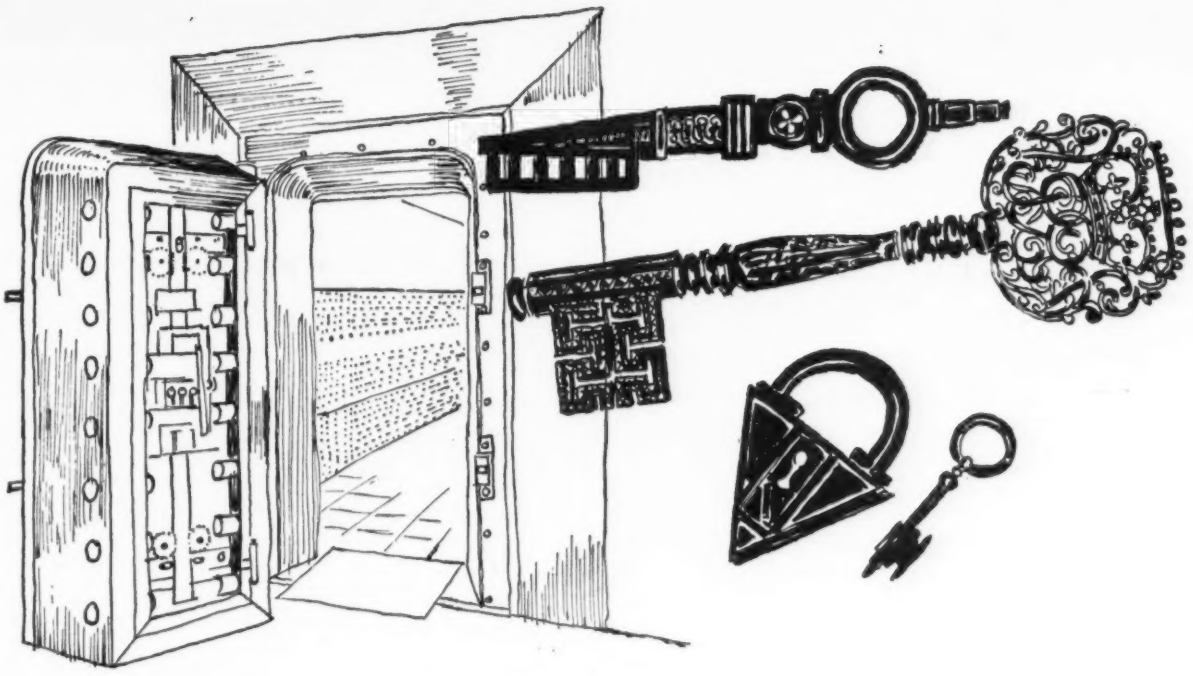
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	22.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$41.00 to 42.00
Unstripped motor blocks	37.00 to 38.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	27.00 to 28.00



symbol of the wife's authority

Soon after the human race started to acquire property, it began to devise safeguards for protecting its worldly goods. Some 4000 years ago, the Egyptians constructed a lock, the principles of which are still in use today. In Greece according to an old description, keys were "the shape of a sickle and . . . on account of their inconvenient form they were carried on the shoulder." Among the Romans, keys were regarded as the "symbol of the wife's authority in her husband's household."

Through ages of development, bolts, bars and locks have been made of wood, bronze and steel—with keys of appropriate size and construction.

Today's keys symbolize not only the wife's authority, but also the family's security. For innumerable locks, safes and vaults, and thousands of other civilian and military needs, an unfailing supply of steel must be maintained . . . And scrap is an indispensable ingredient.

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Why Trade Opposes OCDM Copper Sale

Just the rumor the Government might sell copper brought a storm of protest.

The industry appears to have the strength to balk OCDM, unless there are long strikes.

▪ It's reasonable to assume the Government isn't trying to pull the rug from under the domestic copper industry.

Why then did so much emphatic opposition develop so fast to reports that the Office of Civil and Defense Mobilization was thinking of selling some of its Defense Production Act copper?

Metal In Question—This is metal acquired by the Government in order to subsidize high cost operations. The copper was contracted for during the Korean War when it was desperately needed. It is not stockpile metal.

Here are some of the basic factors bothering the industry.

Sellers don't want the copper on the market now.

Despite the current firmness of copper, there is little doubt that production tops consumption. Strength comes from hedgers against a possible strike.

Difference of Opinion — Leo Hoegh, OCDM administrator, says he would be very careful that his sales didn't disturb the market. But a leading seller says that the copper market is a "knife edge proposition," that every sale affects the market.

Government sales during a time the industry was generally short-circuited with several major strikes would bring only token murmurs from industry. However, the last time the domestic industry was hit hard by general strikes, this surplus Government copper was sold only after the strikes had been settled, and only until pipelines were reasonably full again.

The Government appears to be very sensitive to possible charges of strike-breaking.

If there are no strikes, DPA copper is about the last thing sellers will want to see on the market. The best brains in the industry now say if the four or five major companies can settle with the Mine, Mill union without strikes, both buying and price will ease noticeably.

Agency's Dilemma — OCDM finds itself squarely on the spot. It must buy DPA copper, and must carry it on the books until disposed of. Some observers think it may be running short of money, would like to get some by selling its copper.

Generally observers who don't stand to make or lose depending on what OCDM does, believe the Government agency has no plans to sell copper now.

They figure the agency has about 128,000 tons ready to put on the market in case of extensive strikes. They also figure only about 10 to 20 pct of this could be moved without drawing complaints of market upsetting.

May Happen—A good bet unless OCDM changes its mind voluntarily: Opposition in Congress may develop to the point that OCDM will be ordered to deliver the metal to stockpile and pick up either a check or borrowing authority at the Capitol. Mining states congressmen are on record as violently opposed to the sale of DPA copper. They have little organized opposition nor are they likely to. Copper users have either said nothing or taken a stand near sellers.

The consumers' position is that the level of the copper price is less important than stability. They figure the more factors, like OCDM, that can enter and leave the market, the less stability.

Watching Closely — If OCDM decides to sell there'll be a public announcement to give everyone an equal crack at the metal.

The aluminum people are watching these goings on with more than academic interest. Aluminum has been "put" into the government pipeline, and Arthur Snow, director of aluminum - magnesium div., BDSA, has suggested this could be made available if the industry were in dire need. Aluminum also is faced with the possibilities of strikes this summer.

Copper

Today's market is strong and edgy. Demand is good for both producers and custom smelter copper. Action of consumers in holding off buying until custom smelters

Primary Prices

(cents per lb)	current price	last price	date o change
Aluminum pig	24.70	24.00	8/1/58
Aluminum Ingot	26.80	26.10	8/1/58
Copper (E)	31.50	30.00	3/9/59
Copper (CS)	32.00	33.00	4/13/59
Copper (L)	31.50	30.00	3/9/59
Lead, St. L.	11.30	10.80	4/20/59
Lead, N. Y.	11.50	11.00	4/20/59
Magnesium Ingot	36.00	34.00	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	162-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% Ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. Tin: See right; Other primary prices, pg. 152.

dropped prices near producers' indicates that while buyers want metal, they aren't willing to pay premiums.

Big Inventories Pay — Another reason for the general strength of today's market was highlighted by William B. Huntley, Jr., Brace-Mueller-Huntley, Inc., Syracuse, N. Y., at the recent meeting of the Copper and Brass Warehouse Assn.

Said Mr. Huntley, "There are indications we will continue to have creeping inflation . . . what better place to have our money than inventory.

"Recently I computed our capital investment in inventories as of Jan. 1, 1959, and compared it to Jan. 1, 1955. Using our dollar investment on Jan. 1, 1955, as a 100 pct base, and our tonnage in inventory on the same date as 100 pct, I found on Jan. 1, 1959, our dollar investment was 24 pct greater, and our tonnage was within one pct of our 1955 inventory without any appreciable product changes."

Aluminum

In March output of aluminum was 157,189 tons, easily topping the 142,116 tons registered last month, and the 134,020 in March 1958.

The total for Jan - March 1959 was 456,013 tons. Both first quarter and March were new highs, says the Aluminum Assn.

Hedge Buying

They were referring to business in general. The Purchasing Agents Assn. in Chicago asked its members a special question on its monthly poll of business conditions.

"Is the accelerated rate of business based on hedge-buying, or is it part of an economic boom?"

The results: Hedge buying—66 pct; business boom 34 pct.

Tin prices for the week: April 15—102.50; April 16—102.25; April 17—102.125; April 20—102.125; April 21—102.00.*

* Estimate.

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Sure we're proud of the hundreds of Oakite "firsts" in developing fine cleaning compounds, cost-cutting methods, time-saving mechanical equipment. But we'll never rest on pride. As soon as we find a satisfactory answer to a cleaning problem—our research starts searching for an even better one.

That's why so many users continue to rely on Oakite to reduce their "per unit" cost. They know that year after year, they are getting the best cleaning for the lowest possible cost.

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years' leadership in industrial cleaning

Oakite's pioneering in the future will mean what it has meant for the past 50 years: not only better products, but better service . . . better methods . . . better equipment. All deliberately designed with you in mind to give *you* the most for your cleaning dollar.

This handy guide is a distillation of 50 years of Oakite cleaning experience. It can save you valuable time—and cold cash, too—on all your cleaning operations. Send for it. Oakite Products, Inc., 50A Rector Street, New York 6, N. Y.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63	.....	52.86	55.62
Brass, Yellow	48.24	48.75	48.18	51.06
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80	.....	46.61	56.21
Munts Metal	50.85	.....	46.16	.....
Comm. Bs.	53.90	54.44	53.84	56.96
Mang. Bs	56.54	.....	50.14	.....
Phos. Bs. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $6.90-$7.40; alloy, $14.35, Plate, HR, commercially pure, $5.00-$5.75; alloy, $7.75-$8.50. Wire, rolled and/or drawn, commercially pure, $5.50-$6.00; alloy, $8.00-$9.50; Bar, HR or forged, commercially pure, $4.25-$4.65; alloy, $4.25-$7.15; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.30
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb)..... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $240 to $245
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $18 to $20
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 315 ..... 30.25
No. 120 ..... 29.00
No. 123 ..... 28.00
80-10-10 ingot
No. 305 ..... 34.50
No. 315 ..... 32.50
88-10-2 ingot
No. 210 ..... 43.50
No. 215 ..... 39.25
No. 245 ..... 35.00
Yellow ingot
No. 405 ..... 24.75
Manganese bronze
No. 421 ..... 27.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.75-25.00
0.60 copper max. 24.50-24.75
Piston alloys (No. 122 type)..24.25-25.25
No. 12 alum. (No. 2 grade)...21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)...24.25-24.75
AXS-679 (1 pct zinc)..... 21.75-22.25

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20⅝	18¾
Red brass	24¼	23½
Comm. bronze	25⅛	24⅝
Mang. bronze	19¼	18⅝
Free cutting rod ends.	20½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27¼
No. 2 copper wire 25¾
Light copper 23¾
*Refinery brass 25½
Copper bearing material 24½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27¼
No. 2 copper wire 25¾
Light copper 23¾
No. 1 composition 21
No. 1 comp. turnings 20½
Hvy. yellow brass solids 15½
Brass pipe 16
Radiators 16½

Aluminum

Mixed old cast. ..... 12 —13
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23¾—24¼
No. 2 copper wire ..... 21¾—22¼
Light copper ..... 19¾—20¼
Auto radiators (unsweated). 14¼—14¾
No. 1 composition ..... 19¼—19¾
No. 1 composition turnings... 17¼—17¾
Cocks and faucets ..... 14¾—15¼
Clean heavy yellow brass ... 13¼—13½
Brass pipe ..... 14¾—15¼
New soft brass clippings .... 15½—16
No. 1 brass rod turnings .... 12¾—13¼

Aluminum

Alum. pistons and struts .... 6 — 6½
Aluminum crankcase ..... 9½—10
1100 (2s) aluminum clippings 13 —13½
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 6 — 6½
Industrial castings ..... 9½—10
2020 (24S) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 4¾— 5¼
Old zinc ..... 3¼— 3½
Zinc routings ..... 2 — 2¼
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 37-40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 30-32
Old sheet Monel 26-28
Nickel Silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 6½— 6¾
Battery plates (dry) ..... 2 — 2¼
Batteries, acid free ..... 1¾— 2

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixer common babbitt ..... 9½—10
Solder joints ..... 13¼—13¾
Siphon tops 42
Small foundry type ..... 9½—10
Monotype ..... 9½—10
Lino. and stereotype ..... 8½— 9
Electrotype ..... 7 — 7½
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

(Effective April 20, 1959)

NOW - A NEW "*Push Button*" FLYING SHEAR

NO DOWN TIME to change cut length or synchronization

A HALLDEN SHEAR EXCLUSIVE

A major improvement in high production continuous strip process in-line shearing.

Revolutionary new designs now permit synchronization adjustment AND gear changes to be made without stopping production. Changes in cut lengths are made in just seconds.

Hallden Shears can be furnished in processing lines built by leading machinery manufacturers the world around.

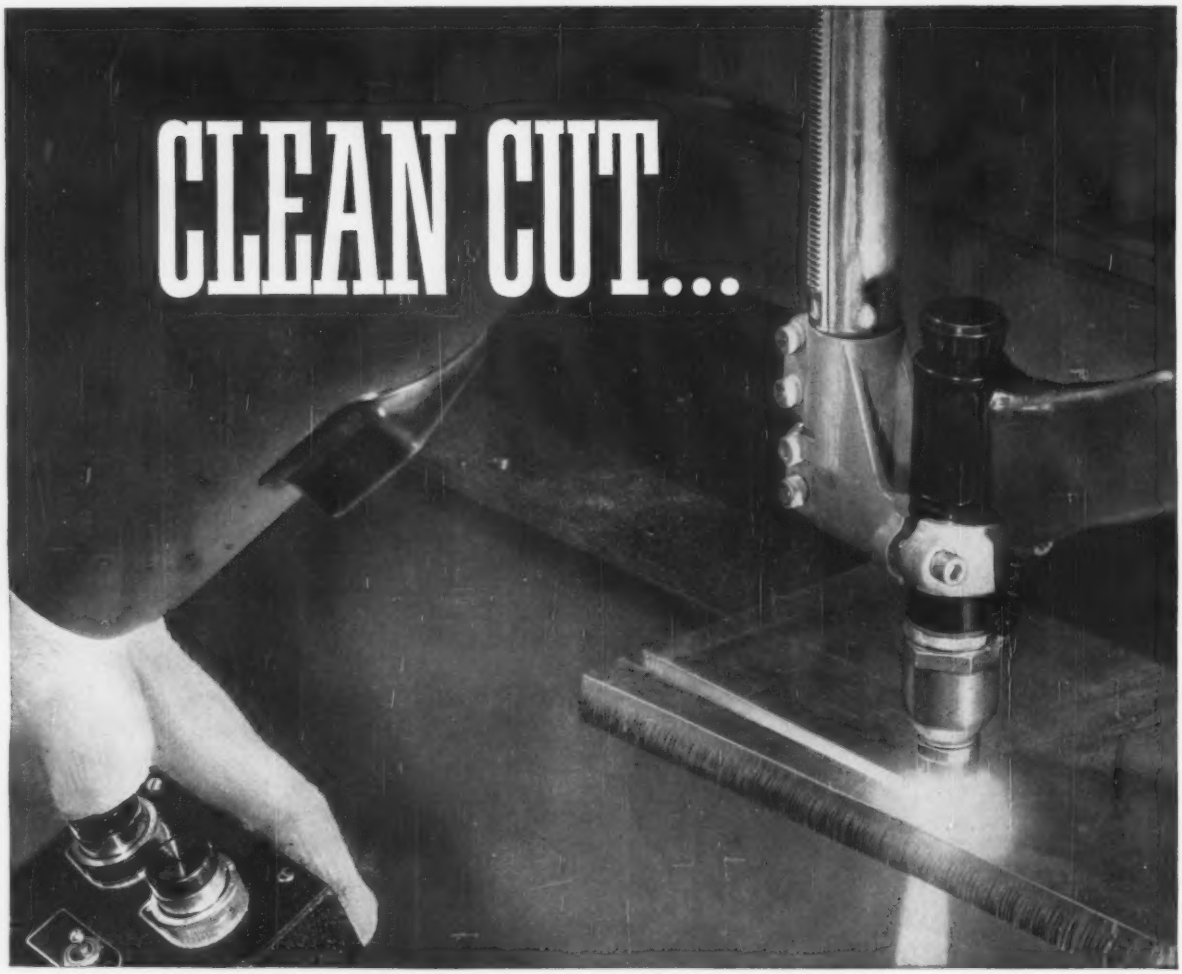
DESIGNED AND BUILT BY

HALLDEN

THE SHEARING SPECIALISTS

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co. Ltd. Bedford, England



...HELIARC Cutting turns hours to minutes

Before: It took 1½ hours to chip an 18-inch hole in an aluminum dome ⅝-inch thick. NOW—The hole is cut in *one minute*—with HELIARC Cutting.

Before: A 54-inch diameter dome hole in ⅝-inch rolled aluminum plate required about 5 hours, with chipping hammers. NOW—Manual HELIARC Cutting does it in about 4½ *minutes.*

HELIARC Cutting employs an extremely high-temperature, high-velocity arc that gives cutting speeds up to 1000 inches per minute on ¼-inch-thick material. It makes saw-like cuts, either square or beveled, in materials up to 3 inches thick . . . *and,* you can take the torch to the work. "HELIARC Cutting is equally effective on aluminum, stainless steel, magnesium, copper and all other metals."

See for yourself—ask your nearest LINDE representative to *prove* that HELIARC Cutting slashes time and labor costs over conventional methods. Call your local LINDE office today! Or write Dept. I-43, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Linde TRADE-MARK

UNION CARBIDE

"Linde", "Heliarc", and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.875 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective April 20, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective April 20, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G5*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6*	6.425 *B2*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective April 20, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Youngstown *R3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Fontana *K1*	†10.75	†26.00	†7.75	†22.00	†4.25	†17.50	†1.75	†16.75	†1.25	†15.75	†0.75	†15.25	0.75	†15.50								
Pittsburgh *J3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Alton, Ill. *L1*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Sharon *M3*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Fairless *N2*	0.25	†15.0	3.25	†11.0	6.75	†6.50	9.25	†5.75	9.75	†4.75	10.25	†4.25	11.75	†4.50								
Pittsburgh *N1*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Wheeling *W5*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Wheatland *W4*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50								
Youngstown *Y1*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
Indiana Harbor *Y1*	1.25	†14.0	4.25	†10.0	7.75	†5.50	10.25	†4.75	10.75	†3.75	11.25	†3.25	12.75	†3.50								
Lorain *N2*	2.25	†13.0	5.25	†9.0	8.75	†4.50	11.25	†3.75	11.75	†2.75	12.25	†2.25	13.75	†2.50	†12.25	†27.25	†5.75	†22.50	†3.25	†20.0	†1.75	†18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Youngstown *R3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Fontana *K1*	†6.25		†2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Alton, Ill. *L1*	4.75	†9.0	8.75	†5.0	11.75	†0.50	12.25	†1.75	12.75	†0.75	13.25	†0.25	13.75	†1.50								
Sharon *M3*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Wheeling *W5*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50
Indiana Harbor *Y1*	5.75	†8.0	9.75	†4.0	12.75	0.50	13.25	†0.75	13.75	0.25	14.25	0.75	14.75	†0.50								
Lorain *N2*	6.75	†7.0	10.75	†3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	†10.75	†24.75	†3.25	†19.0	†0.75	†16.50	4.25	†11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective April 20, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

Furnace, beehive (f.o.b.) Net-Ton
Connellsville, Pa. .....$14.50 to $15.50
Foundry, beehive (f.o.b.) $18.50
Foundry oven coke
Buffalo, del'd $33.25
Detroit f.o.b. 32.00
New England, del'd 33.55
New Haven, f.o.b. 31.00
Kearney, N. J., f.o.b. 31.25
Philadelphia, f.o.b. 31.00
Swedeland, Pa., f.o.b. 31.00
Painesville, Ohio, f.o.b. 34.35
Erie, Pa., f.o.b. 32.00
Cleveland, del'd 34.19
Cincinnati, del'd 32.84
St. Paul, f.o.b. 31.25
St. Louis, f.o.b. 33.00
Birmingham, f.o.b. 30.35
Milwaukee, f.o.b. 32.00
Neville Is., Pa. 30.75

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1959 season. Freight changes for seller's account.

Gross Ton
Openhearth lump $12.70
Old range, bessemer 11.85
Old range, nonbessemer 11.70
Mesabi, bessemer 11.60
Mesabi, nonbessemer 11.45
High phosphorus 11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12 55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 140.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays, Latrobe, Pa. 163.00
Chicago District 168.00
Western Utah 183.00
California 165.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 163.00-168.00
Silica cement, net ton, bulk, Latrobe 29.75
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.$109.00
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Balt. 103.00

Magnesite Brick

Standard, Baltimore $140.00
Chemically bonded, Baltimore 119.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

(Effective April 20, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	174	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3**	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C7*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A7*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube....	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders	
Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	37.50
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (10 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.50	9.87	10.13	8.91	9.29	9.40	9.39	13.24*				
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston	.10	10.22	10.50	12.07	11.27	10.42	10.79	10.34	13.45*	16.79	15.79	20.29	19.54
Buffalo	.15	8.55	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	11.10	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.69	11.15	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit	.15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[8]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee	.15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.51	16.34	15.34	19.84	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.50-8.60	9.70-9.95	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[6]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20[9]	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		10.30	11.55	12.50	10.25	10.10	10.20	10.50	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.45	11.70	12.65	10.65	10.25	10.35	11.15	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	11.64	8.99	9.45	9.53	9.70[7]	10.16		15.41		19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 4 1/16" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 8" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier; [9] 14 ga. & lighter.

(Effective April 20, 1959)

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PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago. *U1.*

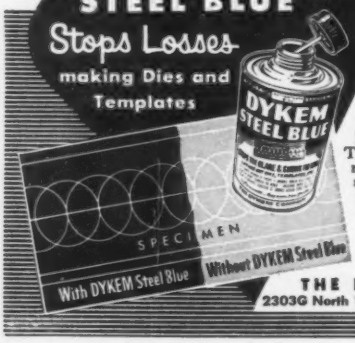
Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall. Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11,* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective April 20, 1959)

(Effective April 20, 1959)

DYKEM STEEL BLUE
Stops Losses making Dies and Templates



Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

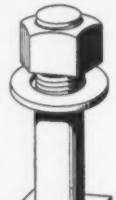
THE DYKEM COMPANY
2303G North 11th St. • St. Louis 6, Mo.

ATLANTA • CHICAGO • DALLAS • DENVER • HOUSTON • HUNTINGTON
MEMPHIS • MOBILE • NEW YORK 17 • SAN FRANCISCO

CUT SCRAPER TIME
END NIGHT CLEANUP & MORNING REBLUING

DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.

THE DYKEM CO., 2303G NORTH 11TH ST., ST. LOUIS 6, MO.



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T-BOLTS & BOLSTER BOLTS
ALLOY STEEL 150,000 LBS. TENSILE STRENGTH
T-Bolts-½", ⅝", ¾", ⅞", 1" Body Diameters
Bolster Bolts to J.I.C. Standards

Special bolts available to 1½" body diameter and 3" Square Head. All bolts except ½" and ⅝" available with Hexagon Heads . . . Hardened Nuts and Ground Washers available for all size bolts.

TWX—DE 894

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WEST POINT MFG. CO.
26943 West 7 Mile Road • Detroit 19, Michigan

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.)
Carloads, delivered, lump, 3-in. x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.
Carloads bulk 12.80
Ton lots, packed 14.45
Carloads, bulk, delivered, per lb of briquet 15.10
Briquets, packed pallets, 3000 lb up to carloads 16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective April 20, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.
Ton lots $3.90
Less ton lots..... 3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd. carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.
Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.48
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

INDUSTRIAL
AND
ORNAMENTAL

PERFORATED METALS

DESIGNED AND PRODUCED
FOR EVERY PURPOSE

Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics and paper punched as required and for all kinds of screens.

We can guarantee sheets that are perfectly flat, straight, parallel on sides, and free from buckle or camber.

A tremendous variety of screens. Our modern tool and machine shop is constantly building new dies placing us in a position to construct special dies as conditions may demand.

Metallurgical and design assistance.

89 years of experience. Large enough for big jobs, small enough for personal attention.

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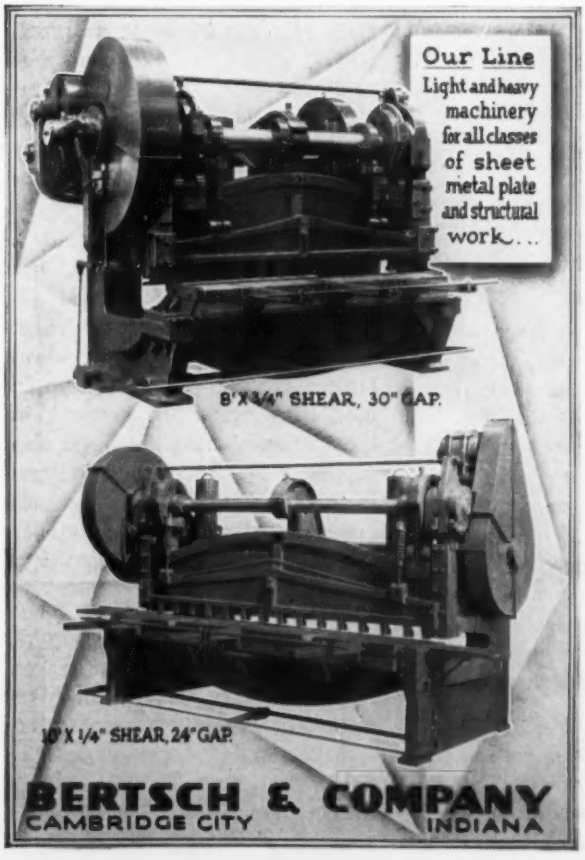
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Light and heavy machinery for all classes of sheet metal plate and structural work...
8' X 3/4" SHEAR, 30" GAP.
10' X 1/4" SHEAR, 24" GAP.

BERTSCH & COMPANY
CAMBRIDGE CITY INDIANA

71.9%* of the Metalworking Market is served by these 20 Cities:

*SOURCE: Iron Age Basic Marketing Data

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SAN FRANCISCO • SYRACUSE •
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Steel Products Co.
Beaver Falls, Pa.

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RAILWAY CARS
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For All Types of Cars

AMERICAN DIESEL LOCOMOTIVE CRANE
30-Ton; Complete with Generator.
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In ICC Operating Condition

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10 Covered Hopper Cars
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"ANYTHING containing IRON or STEEL"

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT
MOTOR GENERATOR SETS

Qu.	K.W.	Make	R.P.M.	Volts D.C.	Volts A.C.
3*	3500	Al.Ch.	514	350/700	13,800/6900 4160
1	2000	G.E.	450	132/265	4160/2400
2*	2000	Whse.	720	600	13,800/6900 4160
2	1250	Whse.	720	600	4160/2400
1	1250	G.E.	450	250	4160/2400
2	1000	Whse.	720	600	4160/2400
2	500	Whse.	1200	125/250	4000/2300
1	450	Whse.	900	280/300	2300
3	300	Whse.	1200	125/250	4000/2300
1*	300	Al.Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
1	150	Whse.	1200	250	2300
1	150	G.E.	1200	250	4600/2300
2	150	Rel.	1200	125	2300

*—3 Unit Sets.

SPECIAL, before removal (1) 1875-K.W. Whse., M.G. Set, Gen. 250-V.D.C., 514 R.P.M. with 2700-H.P. Syn Motor, 13800/6900/4000-V., 3 ph., 60 cy. with Control.

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	3000	G.E.	M.P.C.	300/600	250/360
8***	3000	Whse.	Rev.	525/600	600
1**	2200	Whse.	Mill	600	92/132
8**	1500	Whse.	Rev.	525	600
1**	1250	Al.Ch.	Mill	600	300/600
2**	940	S.S.	Mill	600	800/1000
1**	700	Whse.	Mill	600	143
4**	700	Whse.	Rev.	250	300/700
2**	645	S.S.	Mill	300	1000
1	600	Whse.	Mill	250	110/220
2	600	Al.Ch.	Mill	600	300/600
1	400	G.E.	M.P.C.	270	450
1	300	Whse.	Mill	230	300
2	275	Whse.	Q.M.660.6	250	425/850
1	175	G.E.	C.D.175-A	245	800/1025
1	125	Whse.	SK-184	230	575/850
1	125	Whse.	SK-190	230	450/1000
1	100	Rel.	461-T	250	1150/1500
1	100	Whse.	SK-183	230	450/1000
1	100	G.E.	CD-175	230	400/1200
1	80	Rel.	651-T	230	575/1150
1	80	El.Dy.	25-8	230	525/1050
1	50/60	Whse.	SK-131	230	560/1500
1*	50	G.E.	CD-175	230	400/1200
2*	30/40	Whse.	SK-131	230	560/1500

*—T.E.F.C. **—Enclosed Forced Ventilated.
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Phone Davenport 4-8300

New York Sales Still Lack Strength

Used machinery business there has picked up slightly, but the market still lacks zip.

Best lines for dealers at the moment are fabricating and toolroom equipment.

▪ Despite a slight recent pick-up used and rebuilt machinery business continues slow in the New York area. Dealer comments range from "very poor" to "fair to middling" in describing the present sales picture.

Biggest drawback remains customer reluctance to approve capital expenditures. There are some signs that corporate pursestrings are loosening, but the process is a slow one.

However, inquiries are high. "The phone is going all day long," says one dealer, "but most of the calls are for information only."

More Shopping — Even at the inquiry stage, however, prospects are doing a great deal more shopping than usual. Quality is important, but the heavy emphasis is on price. This very careful approach to prices probably means buyers have trouble getting top management approval on spending. But the fact that prospects are calling at all is taken as a heartening sign that capital appropriations are being made, no matter how slowly.

Steel Strike Blues?—One dealer, who reports business very quiet, believes the threat of a steel strike later this year is a major deterrent. "Our customers carry very little steel in stock; they're afraid of being caught with no material to work on," he explains.

This situation is complicated by the fact that many contract shops in the N. Y. district have been counting heavily on new orders from aircraft plants. These shops find it doubly difficult to build metals inventories as they do not know what grades and analyses will be needed.

Fabricating Market Good — Fabricating equipment remains a relative bright spot in the market. Demand for such items as press-brakes, shears, and bending rolls continues good. This demand reflects a spring construction spurt, especially in housing, as well as subcontracts for missiles and related equipment.

Toolroom equipment, normally a steady seller in this area, has slumped from the heightened demand of a month or two ago. Cranes are holding their own, largely because of the pick-up in fabricating. But crane demand, in the opinion of many dealers, is also supported by lack of suitable items in this market. Buyers want late-model, medium-duty or heavier cranes and these have been hard to find.

High Hopes—Demand for up-to-date equipment is by no means limited to cranes. "It's a sheer waste of time to try and sell old models," says one dealer. Most of the old-timers have been disposed of, but a few clunkers are still kicking around.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
12 x ⅝" Hilles & Jones Pyramid Type
14' x 1 3/16" Bertsch Initial Type—LATE
32' x ¾" BALDWIN PYRAMID TYPE—LATE

BRAKE—LEAF TYPE
12' x ⅛" Dreis & Krump

BRAKE—PRESS TYPE
90 ton Niagara, Model 90-8-10

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	40' Span 220 Volt D.C.
5 ton P&H	57' Span 220/3/60 A.C.
8 ton P&H	55' Span 230/3/60
10 ton P&H	39' Span 230 Volt D.C.
10 ton Milwaukee	57' Span 230 Volt D.C.
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton N-B-P	100' Span 220/3/60 A.C.
30 ton Shaw	70' Span 230 Volt D.C.
120 ton Niles	67' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60 A.C.

CRANES—TRAMRAIL TRAVELING
56 ft. Bridge, Three 215 ft. Runways
82 ft. Bridge, Four Runway 215' & 135'
Motors 208 Volt 3 Phase 60 Cycle

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FORGING MACHINES
1" to 5" Acme, Ajax, National

FURNACES—HEAT TREATING
Electric Furnace Co. Batch Type, Max Load 10,000#
Effective Hearth Area 10' x 12' 6" x 40" ht.

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.

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24" Swing x 48" Monarch Model 22GM—New 1942

LEVELERS—ROLLER
50" Processor & Leveler, Capacity 50" x .109"
66" Guide 17 Rolls 4½" Dia.
72" Leveler 17 Rolls 2⅝" Backed Up

MULTI SLIDE MACHINE
No. 35 U.S. Multi-Slide. Max. Capy. 4¼" wide x .089

NIBBLER
Pullmax Model 2. Capacity 11/32"

PRESSES—HYDRAULIC
300 ton Southwark, Bed 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Plaien 48 x 48", Stroke 15"
1000 ton Southwark, Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESSES—STRAIGHT SIDE
215 ton Clearing, Bed Area 36 x 42", Stroke 24"
260 ton Cleveland #7F, Bed 42 x 84", Stroke 12"
900 ton Hamilton 4E-1809, Bed 101x181", Stroke 30"

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
EF Cleveland, 60" Throat
#8 Kling, 36" Throat
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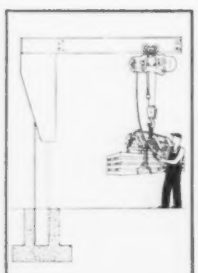

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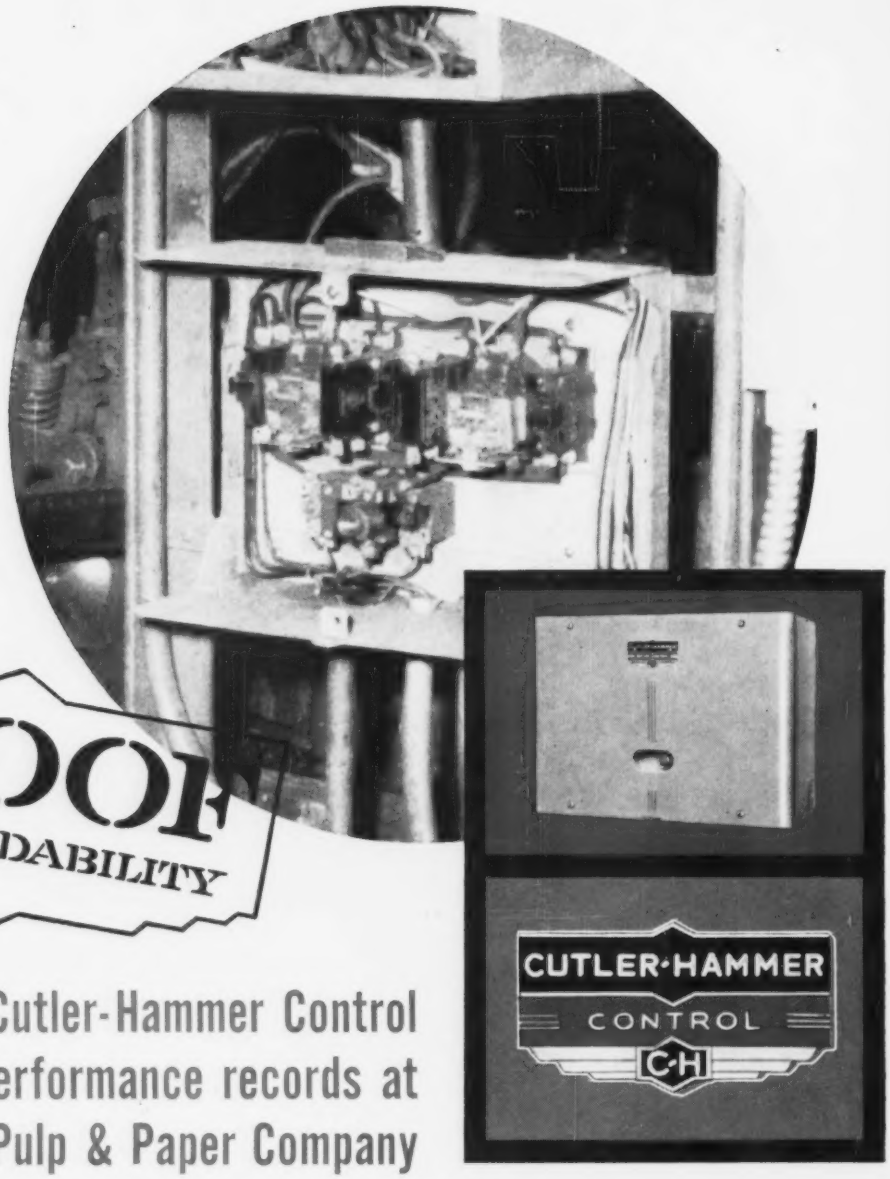

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